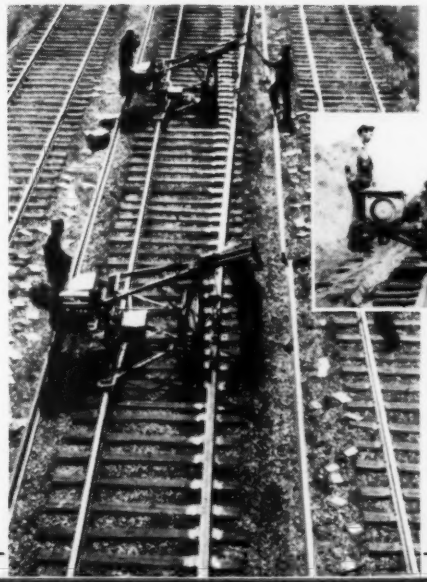
JUNE, 1952

Railway Engineering and Maintenance

S RAILS
F EVERY
NGTH
GHT!



THE MECO TYPE "C" RAIL LAYER...

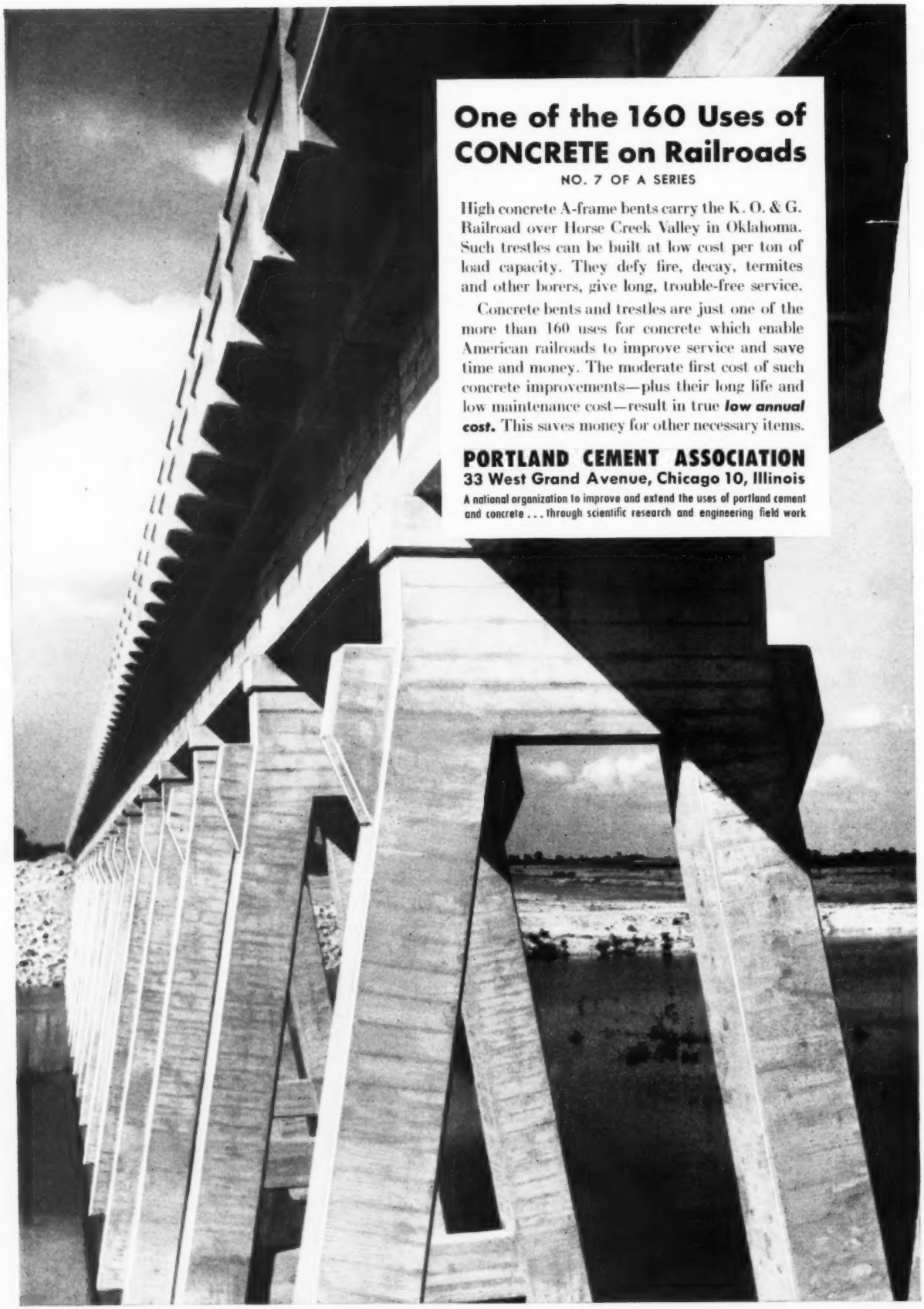
speeds up rail laying jobs of every kind and cuts track laying costs greatly.

A machine gang of four men handles conventional length rails with one Meco Rail Layer. Two Mecos place 78 ft. rails, and two or more Mecos lay long "RIBBONRAIL."

With its unique Set-Off and Transfer Device, the Meco Rail Layer can be moved across the intertrack, or be removed quickly to clear traffic, or to move from one side of track to the other.

The Meco Rail Layer is comparatively light in weight and low in cost.

★ Maintenance Equipment Company ★



One of the 160 Uses of CONCRETE on Railroads

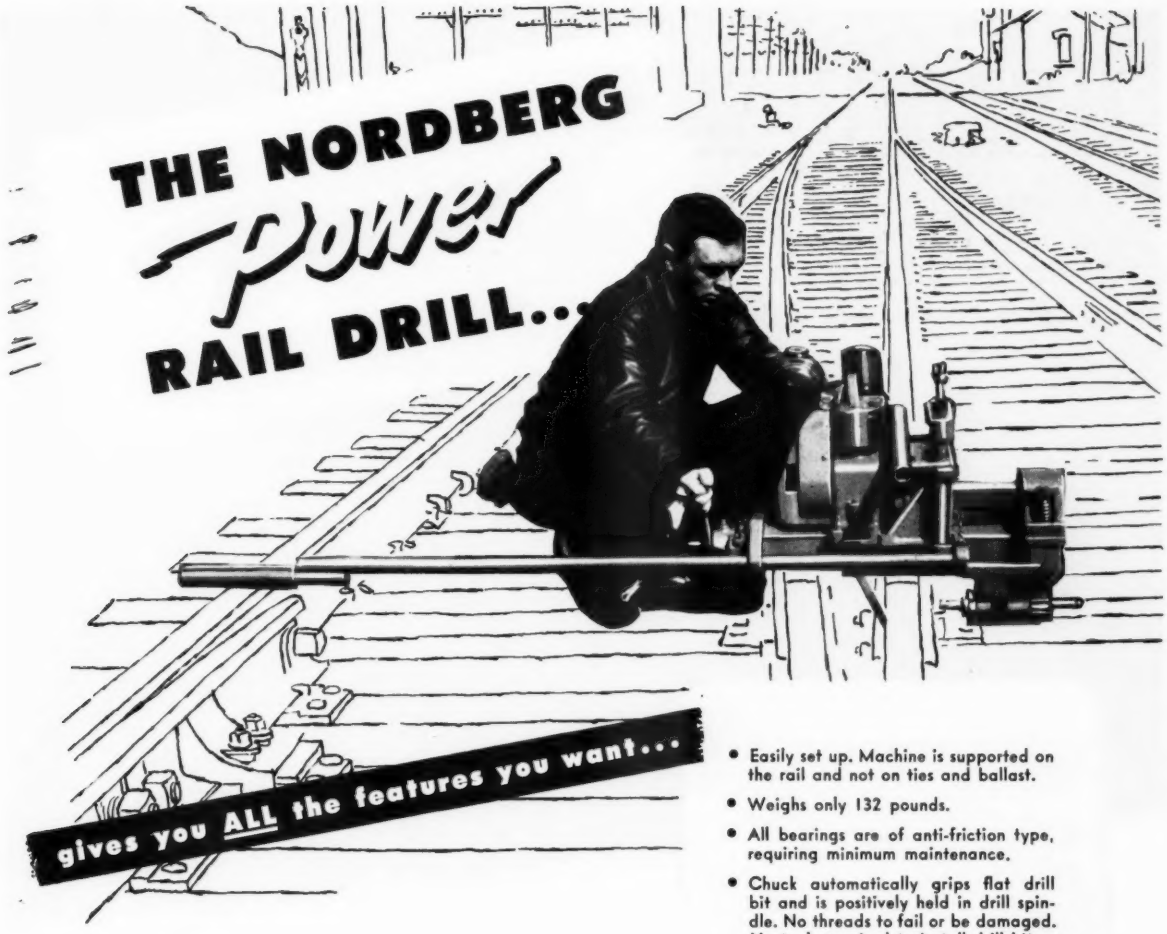
NO. 7 OF A SERIES

High concrete A-frame bents carry the K. O. & G. Railroad over Horse Creek Valley in Oklahoma. Such trestles can be built at low cost per ton of load capacity. They defy fire, decay, termites and other borers, give long, trouble-free service.

Concrete bents and trestles are just one of the more than 160 uses for concrete which enable American railroads to improve service and save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in true ***low annual cost.*** This saves money for other necessary items.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



THE net results of *all* the features of the Nordberg Model CD Rail Drill can be summarized by simply stating that these modern, efficient machines *will drill a 1⅛ inch hole in less than one minute . . . and at savings of up to $1.80 per hole,* as compared to hand drilling methods.

Can you actually *afford* to waste valuable man hours by drilling bolt holes in rail by hand methods? *Get further details by writing for Bulletin 204.*

- Easily set up. Machine is supported on the rail and not on ties and ballast.
- Weighs only 132 pounds.
- All bearings are of anti-friction type, requiring minimum maintenance.
- Chuck automatically grips flat drill bit and is positively held in drill spindle. No threads to fail or be damaged. No tools required to install drill bit or chuck. Both can be removed by the tap of a hammer.
- Stabilizing bar with cam action maintains drill in level position on various rail heights.
- Simple adjustment raises or lowers drill bit with reference to top of rail, utilizing a wing nut and locking lever.
- Wide spread of 14" between rail fork and drill permits drilling at heel blocks, switches and guard rails in track.
- High speed crank quickly moves drill up to rail for drilling.
- Ratchet feed handle permits manual control of the feed.
- Ample power provided by 1¾ H.P. air cooled gasoline engine with 6 to 1 gear reduction.

Sharpen Rail Drill Bits with Nordberg Rail Drill Bit Sharpener Attachment — Write for Bulletin 192.

R752

Use NORDBERG
"Mechanical Muscles"
to do a Better, Faster Maintenance Job at Lower Cost . . .

ADZING MACHINE • CRIBEX* • BALLASTEX* • SCREENEX* • GANDY* • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS • SPIKE PULLER • TRAKGAGER • TRACK SHIFTER • DSL YARD CLEANER
*TRADEMARK

NORDBERG MFG. CO., *Milwaukee, Wis.*

NORDBERG MACHINERY

BRIDGE TIE ANCHOR

The Bridge Tie Anchor offers an improved method for securing open deck bridge ties to supporting steel members and creates a strong spring pressure holding the tie and the supporting member firmly together. The spring action compensates for tie shrinkage, seating and stresses.

The Bridge Tie Anchor is low in cost, easy to install and economical to maintain.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

For additional information, use postcard, pages 599-600

SHORT CUT *ON THE* MISSOURI PACIFIC LINES . . .

WHAT LORAIN BALANCED QUALITY *MEANS TO YOU*

Lorain has many outstanding, exclusive features. But, beyond that, they are designed and built in all respect *so as to give long, dependable, profitable service. It is this "Balanced Quality" that has made Thew-Lorain leadership in the shovel-crane industry for 52 years—that makes "Lorain" a better buy for you.*

THE THEW SHOVEL CO.
LORAIN, OHIO

WITH LORAIN

On the shore of the Mississippi River, just north of Riverside, Missouri, a Lorain dragline helps the Missouri-Pacific Railroad. On a track-straightening job, eliminating a sharp curve to allow higher speeds, safely, a new culvert must be installed for the new road bed and fill added right out to the river's edge.

A Lorain TL25-K dragline on crawler mounting was selected by the Missouri-Pacific to get this job done quickly and economically. Because of the soft underfoot conditions, the Missouri-Pacific put their Lorain "TL" on an extra-long "K" crawler (12 ft. 6 in.), especially adapted to dragline work. This long crawler eliminates nosing-in and provides plenty of soft-ground flotation.

There are many reasons why the Lorain "TL" line of shovels-cranes fits the needs of the modern railroad; and there are 6 other "series" of Lorains available in capacities up to the 2-yard class as shovels, 45 tons as cranes—available in a wide selection of crawler and rubber-tire mountings. Ask your Thew-Lorain Distributor to give you complete facts to fit the needs of your road.

THEW LORAIN®

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS
ON CRAWLERS OR RUBBER TIRES

Time's a-"Wastin"

the cylinder shortage is taking our breath away

Cylinders to carry the compressed gases needed to complete vital welding and cutting jobs in your operations are needed *today*.

You can help. A search for empty and unused cylinders in your shop will help us meet defense and production requirements fill faster your own needs for Airco gases.

Even one empty Airco cylinder can be a big help. A quick check of your cylinder stock may enable you to send us the empties we need to keep our breath going strong.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

AIRCO

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

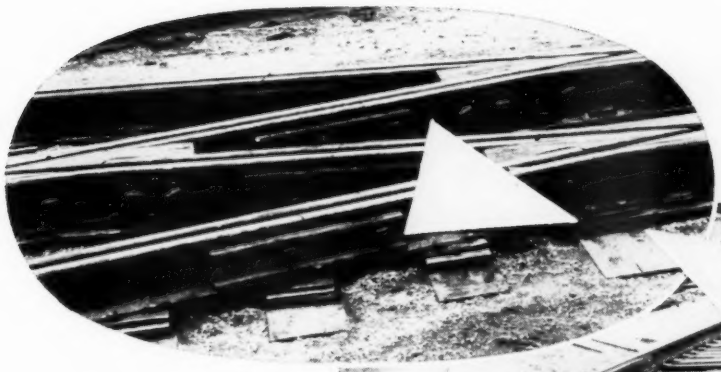
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

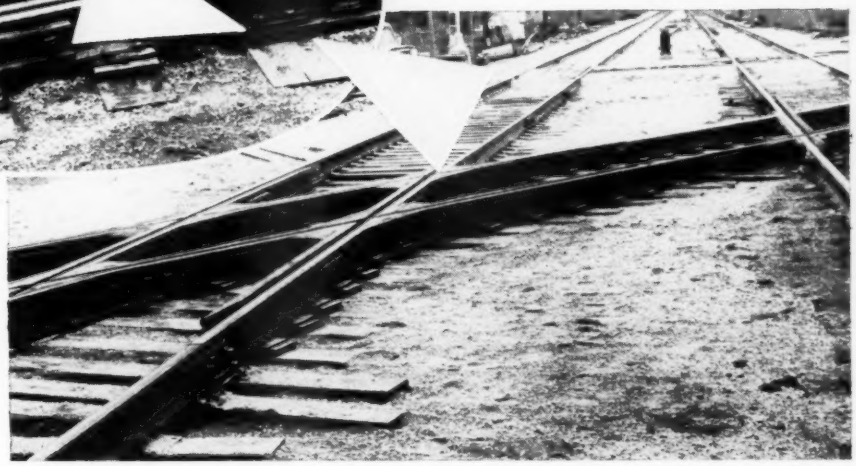
For additional information, use postcard, pages 599-600

First Time in History:—

"A tired crossing" has been tucked into a bed of ***soft natural rubber!*** Result: positive, complete protection, around the clock, year in and year out. Famous Supreme Anchor Seal Rubber Pads (3/8" thick) were placed between base of rails and plates, and (1/4" thick) between plates and ties. These were tailor made for this crossing installation, cut to exact dimensions at our plant, which is designed and equipped exclusively for the production of RAILROAD RUBBER PRODUCTS.



The total cost to produce this crossing bed of rubber was just $287.00. Think of it! This rubber bed will positively protect this crossing to the fullest extent humanly possible, ***for 20 years.***



FRISCO LINES

Inquiries with reference to the use of rubber pads at particular crossings should be accompanied by a print of the manufacturer's plan of the crossing.

If necessary, delivery on large orders can be made in 10 days.

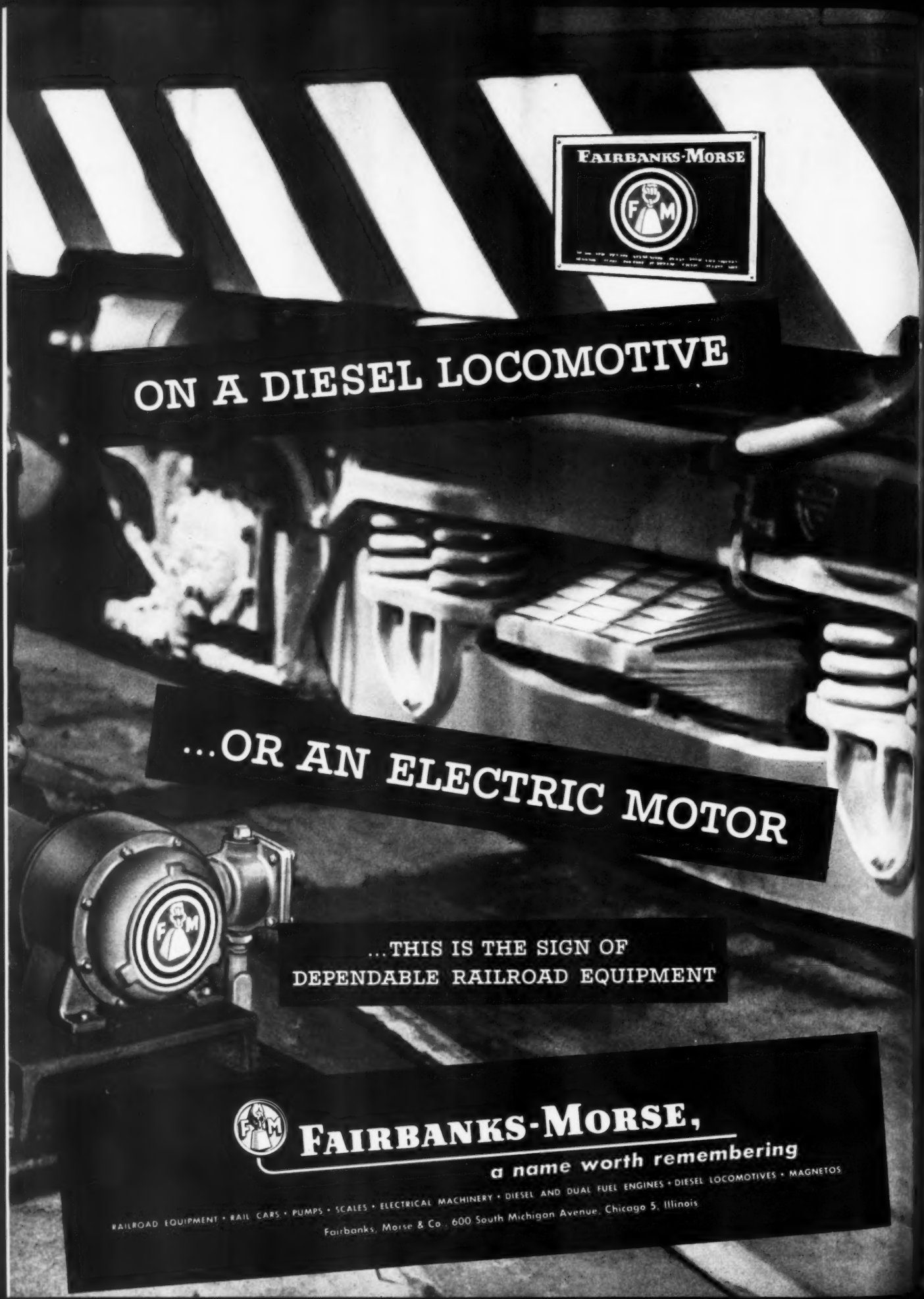
This is just one of countless "firsts" in track construction announcements, which will follow as we unfold the results of our 23 years of constant study of this great subject. Anchor Seal, made of the very best quality of ***natural rubber,*** will control or correct every one of the expensive problems which have troubled the industry since Year One in the History of Railroad Transportation. Our next announcement describes how we successfully countered the problems connected with gauntlet tracks on bridges by replacing steel plates with 3/8"-thick Anchor Seal Pads.

If it's Anchor Seal it's GUARANTEED for complete satisfaction or we refund the full purchase price. Anchor Seal Pads cost less, serve you far better, in many more ways, much longer, or they cost you nothing. Is that fair?

Railroad RUBBER PRODUCTS INC.

1628 East 45th Street
ASHTABULA, OHIO

Complete Technical and Manufacturing Service


FAIRBANKS-MORSE
F M
ON A DIESEL LOCOMOTIVE
...OR AN ELECTRIC MOTOR
...THIS IS THE SIGN OF
DEPENDABLE RAILROAD EQUIPMENT
F M
FAIRBANKS-MORSE,
a name worth remembering
RAILROAD EQUIPMENT • RAIL CARS • PUMPS • SCALES • ELECTRICAL MACHINERY • DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • MAGNETOS
Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois

Complete
BRUSH and WEED KILLING SERVICE

PIONEER in the improved right-of-way brush control

Spraying equipment specifically designed and proven for the purpose

LEADER in effective grass and weed killing control

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Service For Your Railroad

Spray Services *Incorporated*

Pioneers in Right-of-Way Spraying

P. O. BOX 5444 HUNTINGTON, W. VA.

FABCO TIE PADS

UNDER TIE PLATES

At Insulated Rail Joints

REDUCE MECHANICAL WEAR OF TIES

EXTEND LIFE OF BOTH INSULATION AND TIE • GREATLY REDUCE JOINT MAINTENANCE

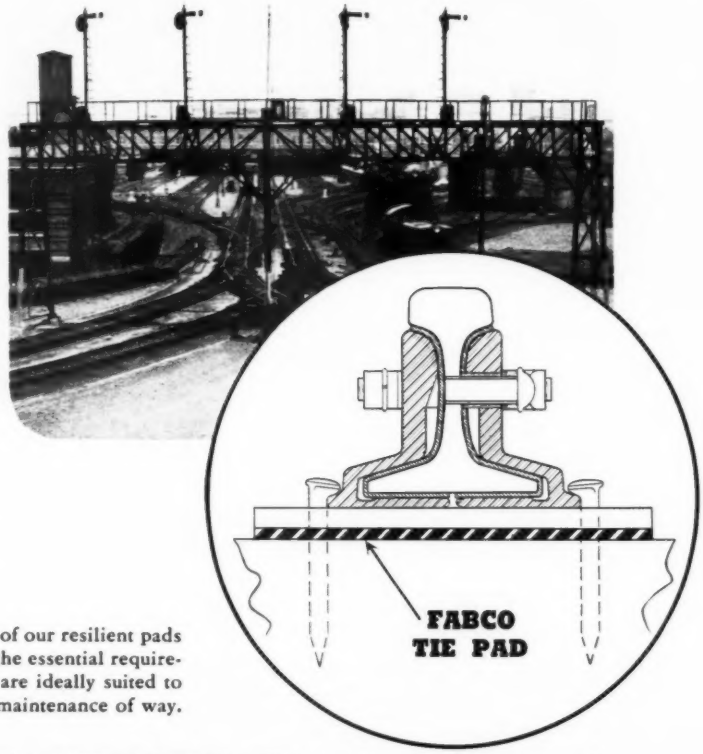
FABCO TIE PADS eliminate plate cutting of the tie and thus insure a permanently firm support for the insulated rail joint. By thus preventing undue movement, the life of the insulation itself is extended, and the cost of maintaining the joint is greatly reduced.

Other Advantages of Fabco Tie Pads

FABCO TIE PADS have withstood in actual service severe modern track conditions — high speeds, extremes of temperature, moisture, brine, sand. Their resiliency assures tight spikes and permanent cushioning of track. FABCO Tie Pads help maintain line and surface; permit use of smaller tie plates; compensate uneven surfaces . . . all making for low maintenance costs and low pad cost.

In view of the costs of ties and labor it is of the utmost importance to railroads to obtain maximum tie life. FABCO Tie Pads greatly extend tie life because they eliminate the mechanical cutting of the tie by the tie plate.

Over 18 years of practical experience in the use of our resilient pads in track applications has made us familiar with the essential requirements of track maintenance. FABCO Tie Pads are ideally suited to engineering and construction requirements of maintenance of way.



It Pays to Specify **FABCO TIE PADS** *Made by the Makers of*

FABREKA

PRODUCTS COMPANY, INC.

222-M SUMMER STREET, BOSTON 10, MASSACHUSETTS

NEW YORK · CHICAGO · DETROIT · SPARTANBURG

PHILADELPHIA · PITTSBURGH · OAKLAND

FABCO TIE PADS • Used on Curves, Bridges, Insulated Rail Joints, Switches, Station Tracks, Station Approach Tracks, Open Track

Off-track versatility

makes the *Pneumatractor* a great all-around maintenance work-saver

Here is the ideal air supply for an eight to ten tamper gang engaged either in spot or in out-of-face tamping. The *Pneumatractor* has all the obvious advantages of an off-track self-propelled compressor. Because it remains out of traffic's way, there is no time lost moving it off and on the rails. As work moves ahead, the *Pneumatractor* keeps abreast of it, pulling the hose manifold along as you go. Hook a trailer on behind and you can carry all the tools used by the gang—fork, etc. as well as the air tampers. And of course, its handy mobility—so ideally fitted for tie tamping—also increases its usefulness for other jobs, whether they be spike driving, spray painting, timber sawing, or many others.

Yet air jobs cover only one side of the *Pneumatractor's* usefulness. Because it is a powerful industrial tractor, it can push or pull anything a tractor can. And because it accommodates so many auxiliary attachments, it is adaptable to a host of specific jobs that usually require separate equipment. A few of these are sketched here. Some others are back hoe trenching, mowing and hoisting, to name just a few. Write for free copy of Bulletin RM-52.

SPECIFICATIONS. Air capacity, 105 cubic feet per minute, actual air at 100 p.s.i.

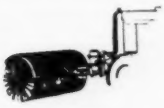
ENGINE AND COMPRESSOR. Unit type—three compressor and three power cylinders in the same block. Engine is 226 cu. in. displacement and develops 36 brake horsepower.

PNEUMASTAT CONTROL saves fuel, wear and tear by operating compressor at demand load.

OTHER SCHRAMM FEATURES: Positive cam-operated intake valves; efficient *Unistage* discharge valve; push-button starting and interchangeable parts.

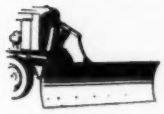
DIMENSIONS. Length 117 inches; width (varying with type of rear wheels) 62⅞ to 91 inches. Available with six types of rear wheels; Standard or heavy wide and narrow and standard or heavy dual wheels. Weight (depending on wheel type) 3935 to 6385 pounds. Prices upon application.


DRIVING SHEETING

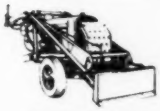

ROTARY BRUSH


FRONT WINCH

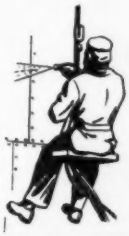

FRONT END LOADER


SNOW PLOW


POST HOLE DIGGER

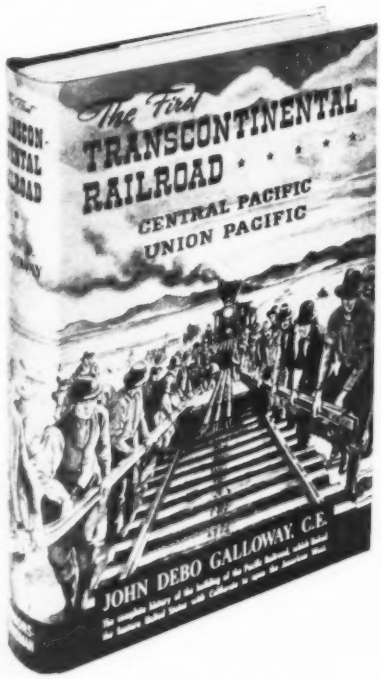

BACKFILL BLADE


ROCK DRILL


SPRAY PAINTING

SCHRAMM INC. *The Compressor People* **WEST CHESTER • PENNSYLVANIA**

The First TRANSCONTINENTAL RAILROAD



By JOHN D. GALLOWAY, C.E.

The construction of the Union Pacific and Central Pacific railroads linking Omaha with Sacramento was the crowning achievement of the railroad era. It was considered by the author the greatest engineering project of the Nineteenth Century.

The author for more than forty years was a leading consulting engineer of San Francisco. He was thoroughly familiar with the original routes of both railroads. While gathering manuscript material he carried on an extensive correspondence with relatives of the builders. Many of the authentic photographs showing construction methods were from his private collection.

The individual contributions of railroad engineers, construction company heads and railroad officials who had a part in this great project are objectively appraised. Biographical sketches of the more prominent engineers and railroad builders of the era are included.

Contents

The Pacific Railroad—The Origin and Development of Railroads Prior to 1870—Early Projects and the Pacific Railroad Surveys—The Builders of the Central Pacific Railroad—The Central Pacific Railroad Company—Locating the Central Pacific Railroad—Constructing the Central Pacific Railroad—The Builders of the Union Pacific Railroad—The Union Pacific Railroad Company—Locating the Union Pacific Railroad—Constructing the Union Pacific Railroad.

320 pages, 73 photographs, 4 maps, bibliography, index

$5.00

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Please send me on Ten Days' Approval a copy of Galloway's FIRST TRANSCONTINENTAL RAILROAD, $5.00. If satisfactory I will remit the list price; otherwise I will mail back the book

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City ..... Zone ..... State .....

Company ..... Position .....

R. E. & M. 6-52

Reviews

"The story of these railroads had been told many times. However, few authors approached the Herculean project with the same appreciation of the problems involved as has Galloway. You are left with the firm belief that building this first transcontinental railroad was truly the greatest engineering feat of the 19th Century."—**Engineering News-Record.**

"At Promontory, Utah, there stands a great stone monument to the **Last Spike** which joined the two branches of this nation's first cross-continental railroad. The story of the Central Pacific's long trek over the Sierras from Sacramento eastward and of the corresponding labors of the Union Pacific's workers who worked west from Omaha is one of the greatest chapters of nineteenth-century progress. This story, this epic of Americana, is told from the viewpoint of a civil engineer."—**The Argonaut.**

"Galloway rates as one of the great engineers who had an important part in the development of Western America. As an authoritative record of one of the nation's greatest engineering achievements, his book is a basic contribution to the literature of American railroading."
Southern Pacific Bulletin.

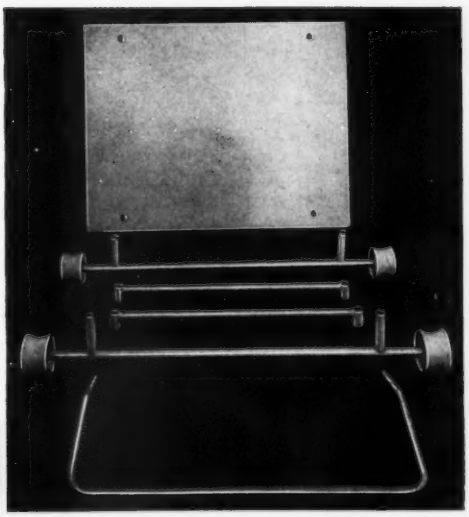
Conserve the Energy of Your Mobile Track Gangs with this WOOLERY Track Tool Transporter!

This handy, light-weight push car carries tools to the job site from the nearest crossing or other point where truck or bus must stop. *Men arrive fresh and ready for work having been spared the laborious job of toting hundreds of pounds of tools and equipment – saves time – and muscles – for the important job!*

Rolls easily on anti-friction bearings even when fully loaded.

Handle can be inserted on either side for pushing in either direction.

Weighs only 160 lbs – yet will carry a thousand pounds of tools or materials! This is due to the novel steel-reinforced weather-proof plywood deck construction. *Light – but amazingly strong!*



Can be set up or dismantled in *less than a minute* for easy loading into a truck, bus or motor car.

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SINCE 1917 RAILWAY MAINTENANCE EQUIPMENT

Woolery MACHINE COMPANY

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Exclusive Export Representatives

PRESSED STEEL CAR CO., NEW YORK, N. Y.

Cummins® Diesels do so many jobs... so much better

...because they're custom-built to fit the job!

On-highway trucks, buses

Industrial locomotives, cranes, shovels

Logging yarders and loaders, crawler tractors

Drilling rigs, centrifugal pumps, generator sets

Earthmovers, off-highway trucks

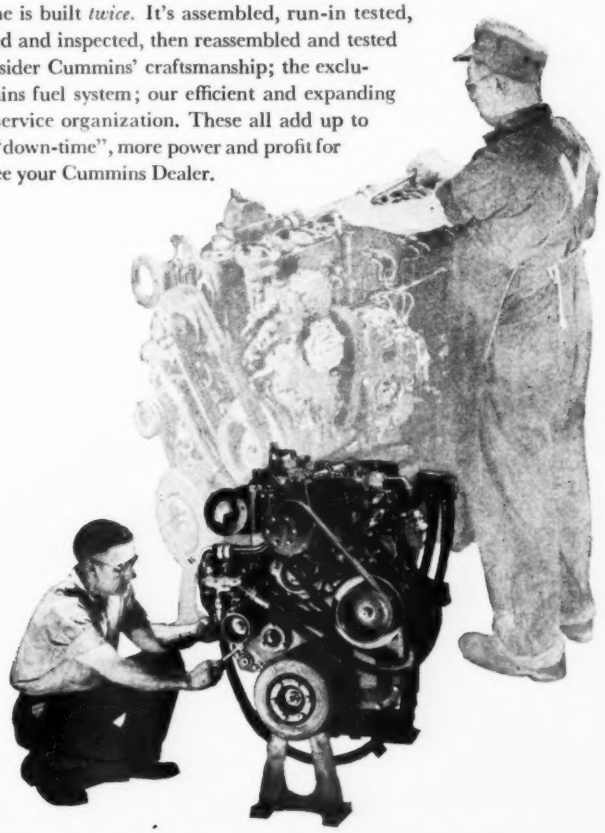
Work boats, pleasure craft

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

...because they're

BUILT NOT ONCE BUT TWICE

Need rugged power? Then you need lightweight, high-speed Cummins Diesels, custom-built to fit your needs. Each engine is built *twice*. It's assembled, run-in tested, disassembled and inspected, then reassembled and tested again. Consider Cummins' craftsmanship; the exclusive Cummins fuel system; our efficient and expanding parts and service organization. These all add up to minimum "down-time", more power and profit for the user. See your Cummins Dealer.



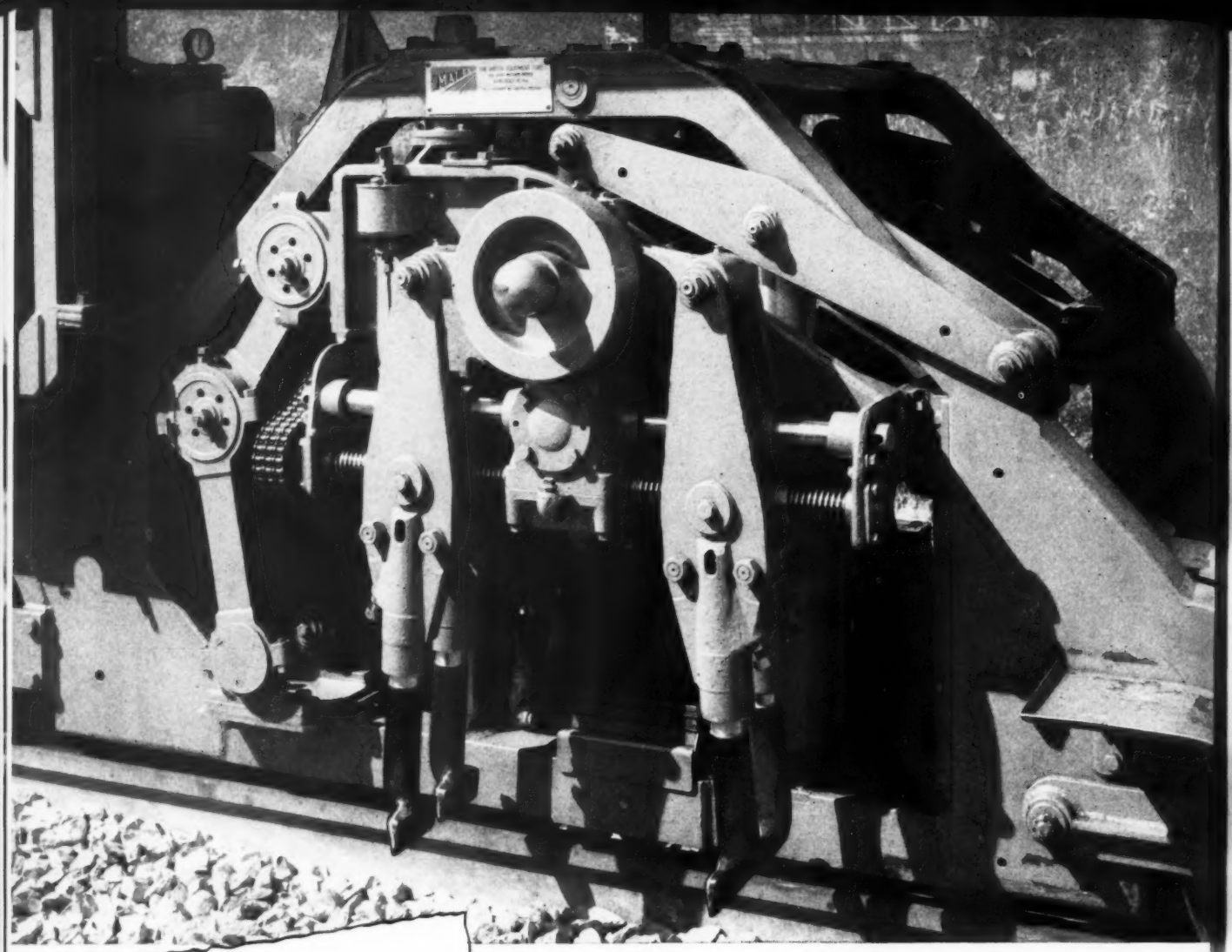
Diesel power by CUMMINS

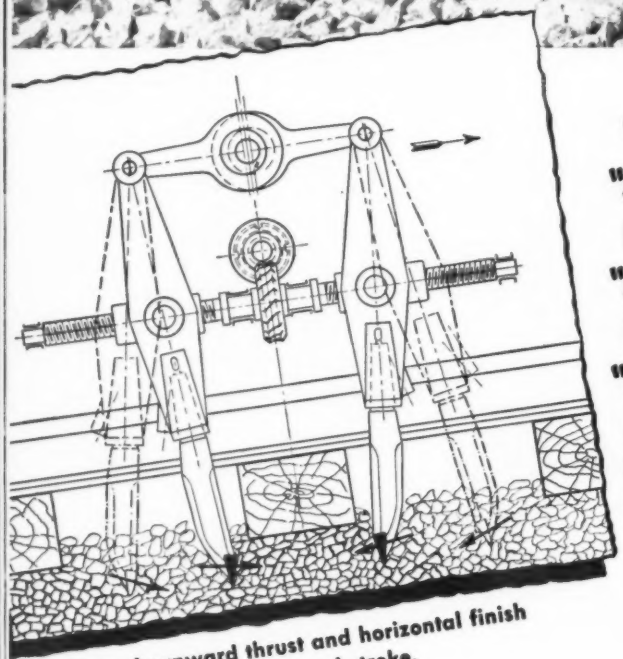
CUMMINS Dependable DIESEL

TRADEMARK REG. U. S. PAT. OFF.

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U. S. A. • Cable: Cumdiex





Note downward thrust and horizontal finish of tamper tool stroke.

There are Three Basic Types of Mechanical Tamping:

"BRUTE FORCE" to ram ballast into place.

"PERSUASION" to urge ballast into place.

"FORCEFUL PERSUASION" which combines pressure—not pounding action—and vibration to give the uniform compaction as produced by the

Matisa TAMPER

THE MATISA EQUIPMENT CORPORATION
224 South Michigan Blvd. • Chicago 4, Illinois

ALL OVER THE WORLD Matisa TRACKWORK SPECIALISTS

NEWS NOTES...

JUNE, 1952

...a resumé of current events throughout the railroad world

Net income of the Class I roads for March and the first three months of this year was steady to improved as compared with 1951, according to estimates of the Bureau of Railway Economics, Association of American Railroads. For March the estimated net income was $51 million, compared with $54 million in the same month last year. For the first three months the estimated net income was $142 million, compared with $106 million last year.

•

The net railway operating income of the Class I railways from freight service in 1951 totaled $1,623.8 million, an increase of $76.1 million, or 4.9 per cent, over that of 1950, according to figures compiled by the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission. This is a peak for this figure since the commission first began separating net railway operating income between freight and passenger service in 1936. On the other hand passenger service in 1951 showed a deficit of $681.6 million, the largest since compilation of these figures was started.

•

Actual deliveries of new domestic freight cars in April totaled 7,403, compared with 8,159 last March and 8,274 in April 1951, according to a joint announcement of the American Railway Car Institute and the Association of American Railroads.

•

A freight-car production program, which contemplates the building of 11,000 cars per month for the 21-month period from next October 1 to July 1, 1954, has been approved by the Defense Transportation Administration. It also provides for the building of 11,875 cars per month during the subsequent 12 months from July 1, 1954, to July 1, 1955.

•

The proposed fourth-quarter program of allocations for the railroads calls for 33,000 freight cars, 1,021 locomotive units, 100 passenger cars and 450,000 tons of rails. This program was drafted by the Defense Transport Administration and has been approved by the Railroad Equipment Division of the National Production Authority. Latest report, however, is that the rail allotment has been reduced to 387,000 tons.

•

The $2 per diem rate, which was recently approved by railroad subscribers to Car Service Rules, became effective on May 1. Applicable on cars in the United States, it represents an increase of 25 cents over the former rate of $1.75.

•

Air-travel accidents in 1951 caused fatalities at the rate of 13 per billion passenger-miles, which was more than three times the railroad rate of 4.16, according to figures compiled by the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission.

NEWS NOTES (continued)

Railroads may now spend up to $2,500 on "minor capital additions" without authority from the Defense Transport Administration and National Production Authority, i.e., without filing CMP-4C applications. This limit, supplanting the former limit of $750, was established in an amendment to NPA's order, M-73, which governs acquisition of maintenance, repair and operating supplies, as well as minor capital additions.

•

The Pennsylvania's Broad Street Station in Philadelphia has been abandoned and this historic structure is now being demolished, along with the elevated track structure known as the "Chinese Wall," which extends from the station to the Schuylkill River. Trains formerly using the old station are being handled at the Broad Street Suburban Station or at Pennsylvania Station—30th Street.

•

Thirty-Minute longer schedules between New York and Chicago for the "Twentieth Century Limited" and the "Commodore Vanderbilt" of the New York Central went into effect on April 27 coincident with inauguration of daylight saving time. The change is expected to "contribute greatly to riding comfort and dependability."

•

A five-year $53 million expansion program for the Western Pacific was recently announced by President F. B. Whitman. Some of the items include $836,000 for maintenance of way work equipment, $4,740,000 for diesel locomotives, $9,763,000 for new and heavier rail, $1,560,000 for ballast, and $22,795,000 for freight cars and allied equipment.

•

Continuing a trend noted by some operators as early as February, highway truck traffic declined during April. Tonnage losses of 15 per cent or more have been reported by many operators at a time when there is normally a traffic upswing.

•

Highway trucks having single-axle loads of 22,400 lb. cause 6.4 times as much cracking of concrete pavements as trucks having axle loads of 18,000 lb. This was one of the many findings from tests recently conducted in Maryland under official auspices. In general the tests demonstrated that serious damage is caused to pavements by trucks having excessive axle loads.

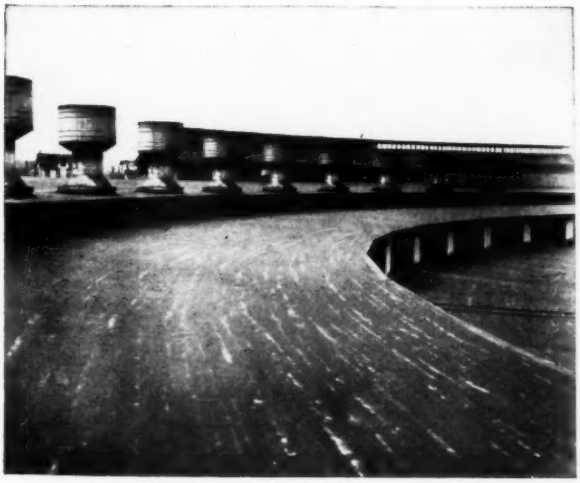
•

ALSO WORTH NOTING—Application for a 10 per cent increase in passenger fares has been filed with the Interstate Commerce Commission by a group of Western railroads, headed by the Missouri Pacific and the Southern Pacific . . . The Brotherhood of Railroad Trainmen is considering asking for another wage increase . . . The Senate has passed a bill to liberalize the benefit provisions of the Railroad Unemployment Insurance Act . . . J. Haden Alldredge has been elected Chairman of the Interstate Commerce Commission, succeeding John L. Rogers who has retired from membership on the commission . . . The Western Maryland is the latest addition to the growing list of roads that have passed the 100-year mark.

...and

"many happy returns" for years to come from your newest Johns-Manville Flexstone Built-Up Roof

THE FLEXSTONE* ASBESTOS BUILT-UP ROOF recently installed on the Hagerstown Engine House shown below will be on hand to remind the Western Maryland of its 100th birthday for many years hence.



*Reg. U.S. Pat. Off.

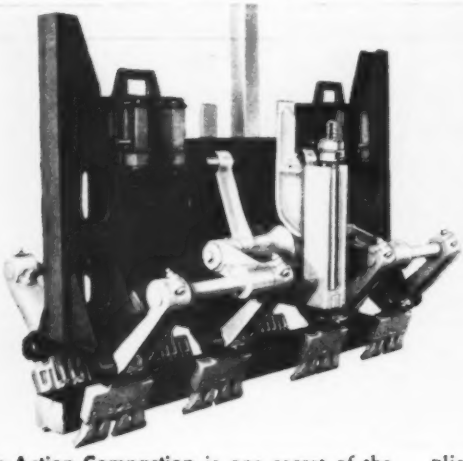
For a Flexstone Roof is designed for just the type of rugged service it will get around a railroad yard . . . it is designed to last for years and years under the hottest sun . . . under freeze and thaw . . . wind and rain . . . smoke and cinders—and it is designed to withstand such gruelling service with little or no upkeep expense!

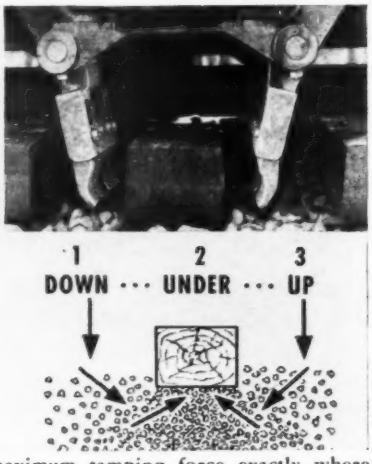
Flexstone Built-Up Roofs assure long years of dependable service under such conditions. Made of time-defying asbestos, each ply is a built-up flexible covering of stone that won't dry out, yet needs no protective coating. A Flexstone Roof is not only weatherproof, but *fireproof* and rotproof as well. And because it is smooth-surfaced, it permits even, efficient drainage at all times.

Why not send for booklet BU-51A on J-M Flexstone Built-Up Roofs—the roof that starts with *low initial cost* and gives years of service at the lowest possible maintenance. Address Johns-Manville, Box 60, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville** 94 YEARS OF SERVICE TO TRANSPORTATION

A new grade, with new ballast was recently constructed by the Spokane, Portland and Seattle Railroad near Yellepit, Washington. The ballast is 3/4" to 2½" crushed quarry rock with new, 115-lb. rail and 24 ties to the panel. This track, having been tamped by another method before, was being smoothed with the Pullman-Standard Power Ballaster. During this operation the Power Ballaster averaged three-quarters of a mile per day of six hours actual operating time . . . 660 feet of smoothing production tamping per hour!





Triple-Action Compaction is one secret of the Power Ballaster's ability to produce better, longer-lasting track. *Left:* The drop-head assembly applies tamping force equally to all tamping bars and delivers 36 complete tamping strokes a minute. A free-falling drop-head combined with ram action provides a tamping force which progressively *increases throughout the tamping stroke* and tie-tamping cycle and produces maximum ballast compaction *under the tie.* A readily made adjustment regulates the depth reached by the Power Ballaster's controlled compaction—applies maximum tamping force exactly where wanted. That's why no production tamper today can equal the Power Ballaster's production efficiency and quality in smoothing surfacing work. *Upper Right:* Because the Power Ballaster has 32 tamping bar positions and five different sizes of quickly interchangeable tamping bars, the Power Ballaster: (a) is a universal machine, (b) produces a "squared" under-tie-and-rail area of compaction fully meeting A.R.E.A. specifications, and uses the method specified by the A.R.E.A. *Lower Right:* Diagram shows triple-action compaction.

N. S. WESTERGARD, *Assistant to General Manager,* Spokane, Portland and Seattle Ry., tells about another important feature of the Power Ballaster tamping—one of the factors which makes Power Ballasted track last longer —cost less. (*see next page*)

SUBSIDIARY OF

PULLMAN

ROAD & TRACK EQUIPMENT DIVISION

BIRMINGHAM • PITTSBURGH • NEW YORK • WASHINGTON • SAN FRANCISCO • 79 EAST ADAMS STREET

Pullman-Standard POWER BALLASTER

Railroad inspection after three, four, and five years of heavy daily traffic has proved that Power Ballasted track has longer lasting qualities and requires less rework. Experience has also demonstrated that for production economy, speed and performance, you can't beat the Pullman-Standard Power Ballaster. It produces under-tie-and-rail area compaction to A.R.E.A. standards and by the methods specified by A.R.E.A.

on the Spokane, Portland & Seattle Ry.

The superior operating performance and work quality of the Power Ballaster is the result of Pullman-Standard's continuing development and improvement program. Tamping operations of the Ballaster under all types of ballast and raise conditions are field-studied each work season by Pullman-Standard engineers. The collected field data and observations become the base for new design features and new labor-reducing gang line-ups. Thus, the Power Ballaster has the highest *established* equipment availability and life; the lowest maintenance and labor requirements, and the highest production rate of any production tamper available today.

minimizes track settlement

You don't have to wonder what the Pullman-Standard Power Ballaster could do for you. You can find out exactly what money-and-time-saving advantages it can give you, while it's tamping your own ballast. You can find out in one of these four ways: (1) outright purchase; (2) rental for 90 days, with option to buy (with all rental payments applied to the purchase price); (3) straight rental for a minimum period of three months; (4) deferred quarterly payments over a period of 1 to 3 years. The rentals and deferred payments are established at substantially less than the realizable savings accruing during the payment periods.

SPOKANE PORTLAND AND SEATTLE RY.

"When we use the POWER BALLASTER for 0"—3" raises (such as is the case in smoothing operations), we have been unable to measure any post-tamping track settlement. When we use the POWER BALLASTER for raises of 8" or more, we find that track settlement, over a period of years, runs a maximum of 1" or less and that it is uniform. We ascribe this uniformity and negligible settlement to the fact that the POWER BALLASTER'S 32 tamping bar positions directly address the tie and tamp with a three directional, progressively increasing force. Since uniform and minimum settlement, following raising and smoothing operations, are the vital factors of long track life, we consider these features of POWER BALLASTER production tamping to be most important."

Here's what YOU can expect from your POWER BALLASTER:

- Longer Lasting Track
- More Production—Lower Labor Requirement
- Long Equipment Life
- Maximum Use of Track Time
- Easy Operation and Maintenance
- Universal Application—Versatile Production

Your Assurance: PULLMAN-STANDARD has been one of the great U.S. railroad equipment suppliers for 73 years; its time proven integrity and reliability are behind the POWER BALLASTER to protect your equipment investment and to assure a factory stand-by of spare parts and continuing factory service.

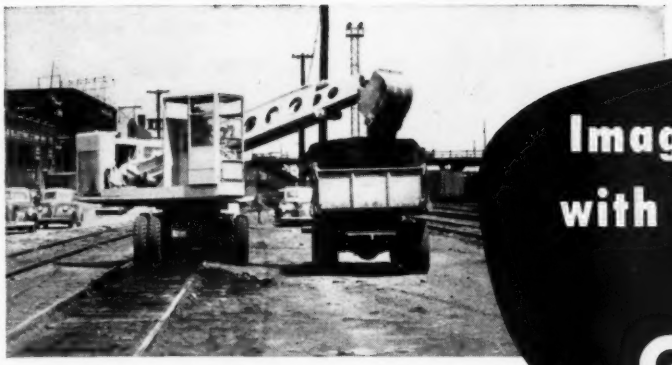
Write for Booklet containing complete detailed engineering data and operating facts about the POWER BALLASTER.

You are cordially invited to visit the Pullman-Standard Industrial Showroom when in Chicago.

PULLMAN INC.

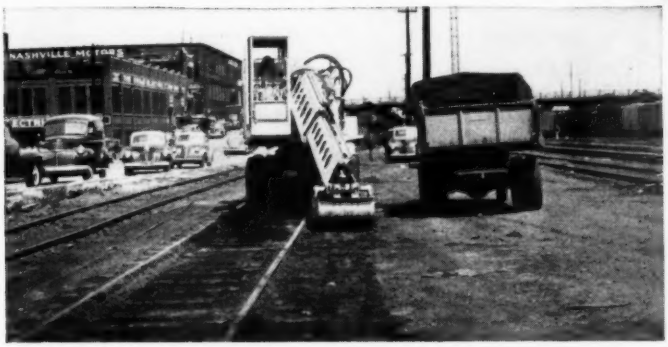
PULLMAN-STANDARD CAR MANUFACTURING COMPANY

CHICAGO 3, ILL. • CANADA: THE HOLDEN CO., LTD., MONTREAL • TORONTO • WINNIPEG • VANCOUVER



Gradall does a fast, neat job in cleaning up and loading cinders which constantly accumulate between and outside the rails.

Imagine doing this job with any other machine than a GRADALL



Gradall's remarkable arm-action packs plenty of power and provides, for the operator, amazing accuracy and precision that avoids any damage to rails, ties or tie plates.

A quick change of an attachment—a matter of minutes—and the Gradall is digging a neat drainage ditch between tracks.

CLEANING CINDERS from track and between ties is customarily a manual job—laborious and time taking. The multi-purpose Gradall with its unique *arm-action* and *controlled down pressure* makes it possible to do this costly job by machine—doing it cleaner and safer than with any other earth-handling machine—doing it faster and far cheaper than by hand.

Gradall's versatility, positive control, and full hydraulic action, make it an ideal machine for railroad maintenance service. It works well in close quarters—around poles, signal standards and bases—under low-hanging wires and ceilings. Interchangeable attachments for many different jobs are available in standard and special designs.

To get all the facts about the multi-purpose Gradall, see your nearest Gradall Distributor, or write The Warner & Swasey Company, Cleveland 3, Ohio.

ONE MACHINE DOES ALL THESE RAILROAD MAINTENANCE JOBS

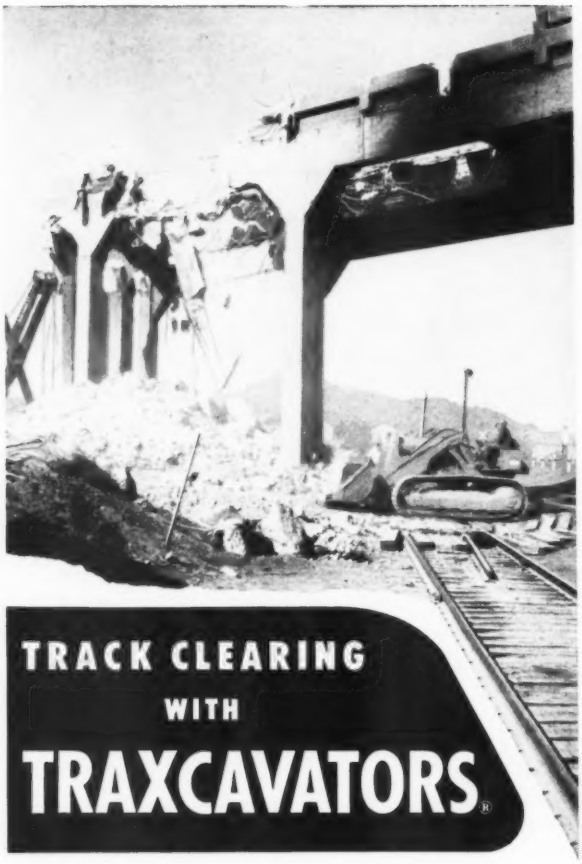
- Sloping and Grading
- Widening Cuts and Fills
- Restoring Embankments
- Cleaning Tracks and Road Beds
- Excavating
- Trenching and Backfilling
- Ripping and Loading Old Pavement

Gradall®

DIVISION OF WARNER & SWASEY Cleveland

Gradall Distributors in over 60 principal cities in the United States and Canada

GRADALL—THE *Multi-Purpose* MACHINE FOR OFF-TRACK MAINTENANCE



TRACK CLEARING WITH TRAXCAVATORS®

Right-of-way is quickly opened as the HT4 easily and surely cleans the track of concrete chunks. One man controls over 6,000 pounds of lifting power plus 9,500 pounds of pushing power to crowd the rugged bucket full of debris from the demolished overpass. The HT4 can work close to structures with complete safety . . . has low overall height for places where clearance is at a minimum—is designed to fit all the requirements of railroad construction and maintenance.

Ask your "Caterpillar" Dealer for complete details on TRAXCAVATOR's low-cost railroading abilities . . . or write direct.

CATERPILLAR TRACTOR CO., Peoria, Ill.

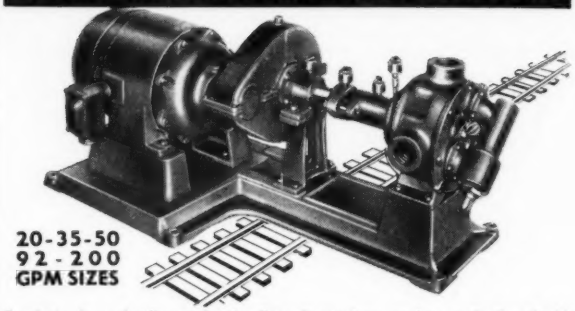
TRACKSON

A SUBSIDIARY OF CATERPILLAR

TRAXCAVATORS®
TRACLOADERS
PIPE LAYERS
ANGLEFILLERS

VIKING

FULFILLS THE NEED FOR A COMPLETE LINE OF TOTALLY ENCLOSED, OUT-DOOR, SINGLE PUMPING UNITS



20-35-50
92-200
GPM SIZES

For fast, clean, loading and unloading of petroleum products and other liquids up to 11,000 S.S.U. Ideal for installing out of doors without protection of any kind.

Reduce your pumping time with these big, rugged units. Built to take it.

OUTSTANDING FEATURES:

1. A complete range of sizes. See capacities listed at left above.
2. New, oil-tight, cast iron gear case. No leakage.
3. Radial bearing for pump shaft on 200 gpm size. Bronze bushed sizes.
4. Stainless steel pump bearing for smaller shaft. No rusting.
5. Viking valve on pump head (Optional).
6. Extra long stuffing box on pump. Leak resistant.
7. Speed and capacity range available for each size pump.
8. Five ball check grease cups. (Other style grease fittings optional.)

VIKING
AN HONORED NAME IN PUMPING

For complete information, send for free bulletin SP-223CY today.

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

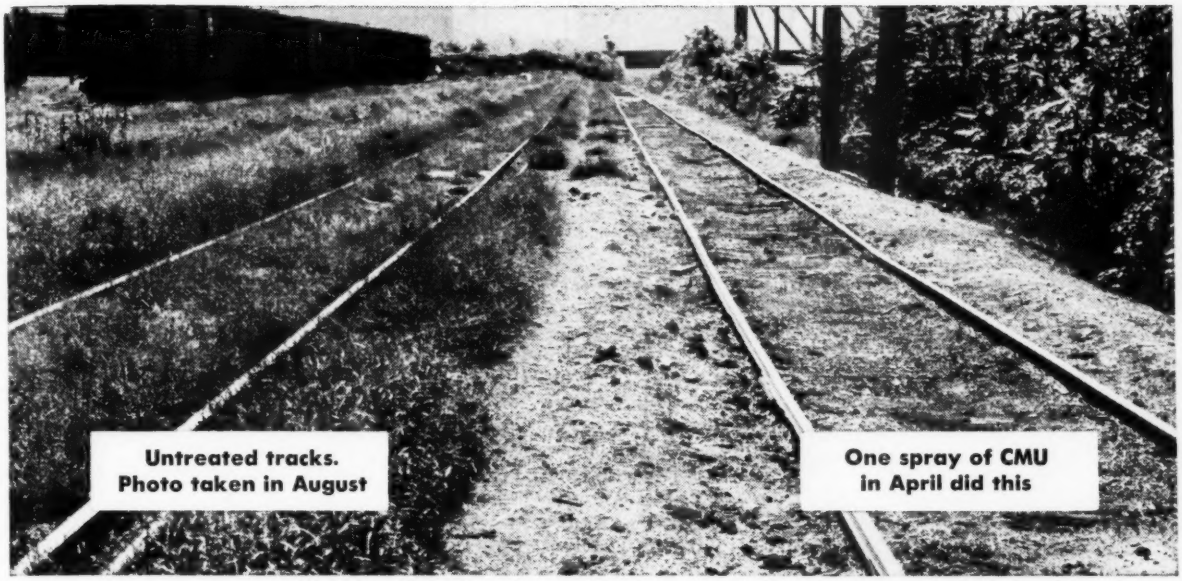
The IMPROVED GAUTIER

the FINEST in RAIL ANCHORS!

Write for complete information

MID-WEST FORGING & MANUFACTURING CO.

General Offices: 38 South Dearborn Street, Chicago 3, Illinois • Mfg. Plant, Chicago Heights, Illinois



NEW DU PONT 80% CMU WEED KILLER

KEEPS GROUND BARE OF ALL VEGETATION

Here is a new effective way to keep weed growth out of ballast, switches, sidings, firebreaks and yards. New Du Pont 80% CMU Weed Killer destroys grass, broadleafed weeds and other vegetation. And one application does the job for as long as a year!

This effective new chemical weed killer is absorbed by the roots, and gives thorough results. Tests throughout the United States and Canada have shown conclusively that CMU Weed Killer really keeps the ground bare. It's ideal to protect all kinds of outdoor railway installations, and reduce fire and maintenance problems.

Du Pont CMU has other advantages, too. It is non-volatile, so there's less danger of spray drift damage. It is non-flammable and non-corrosive.

Get this free leaflet *on uses of new Du Pont 80% CMU Weed Killer. For full details on CMU as well as "Ammate" and other Du Pont weed and brush killers, write Du Pont, Grasselli Chemicals Dept., 5031 Du Pont Bldg., Wilmington, Delaware.*

★ ★ ★

DU PONT CHEMICALS FOR THE FARM INCLUDE:

Fungicides: PARZATE* (Liquid and Dry), FERMATE,* ZERLATE,* Copper-A (Fixed Copper), SULFORON* and SULFORON*-X Wettable Sulfurs . . . *Insecticides:* DEENATE* DDT, MARLATE* Methoxychlor, LEXONE* Benzene Hexachloride, KRENITE* Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* AMMATE,* 2,4-D, TCA and 2,4,5-T . . . *Also:* Du Pont Cotton Dusts, Du Pont Spreader Sticker, PARMONE* Fruit Drop Inhibitor, and many others.

*REG. U. S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

Listen to Du Pont's "Cavalcade of America"—NBC—Tuesday Nights

On Rights-Of-Way

AMMATE® KEEPS BRUSH DOWN WITH FEWER SPRAYS

For lower-cost brush control, "Ammate" Weed Killer is ideal. Many users report "Ammate" sprays once every five years control brush along their rights-of-way. Thus it is possible for maintenance crews to cover more ground more economically.

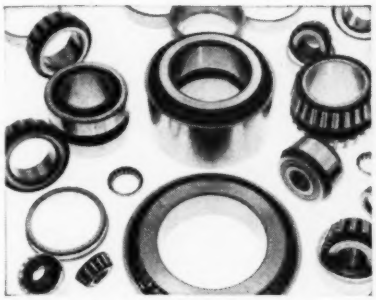
"Ammate" does not leave soil unproductive, so grass and low growth come back to control erosion. It's non-flammable, non-volatile. For further details, write to Du Pont.

DU PONT
REG. U. S. PAT. OFF.

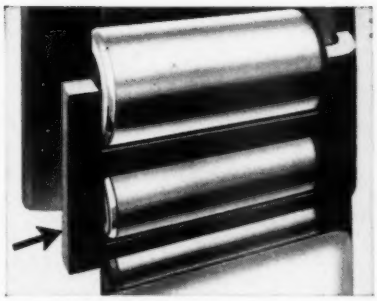
150th Anniversary

Better Things for Better Living . . . through Chemistry

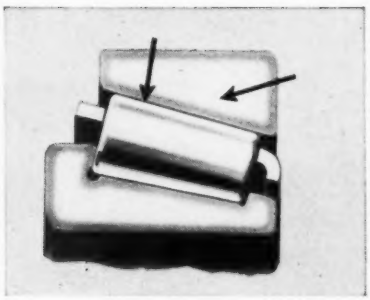
9 good reasons for specifying TIMKEN® tapered roller bearings



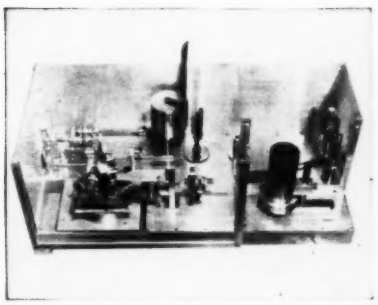
26 TYPES. Because Timken® bearings are made in 26 types, you get exactly the right tapered roller bearing for your job.



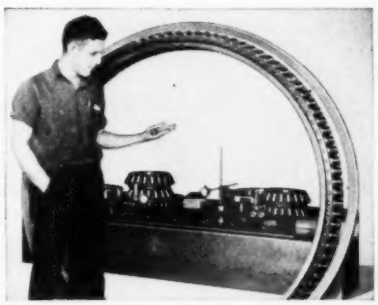
SOFT STEEL CAGE separates the rollers in Timken tapered roller bearings and prevents scuffing.



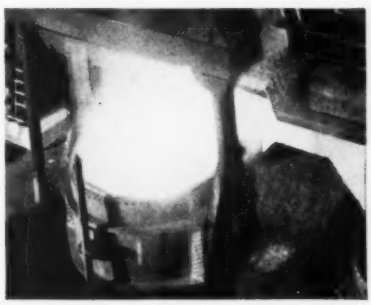
TOUGH INSIDE—HARD OUTSIDE. Case carburizing of rollers and races gives a wear-resistant surface, shock-resistant core.



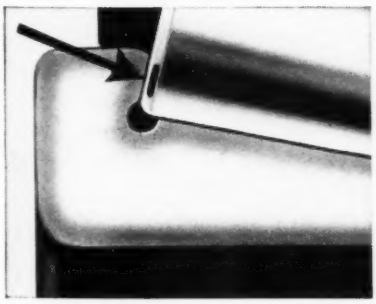
MICRO-INCH FINISH. With help of the profilograph, which measures surface irregularities to a millionth of an inch, the Timken Company has developed a bearing finish of micro-inch accuracy.



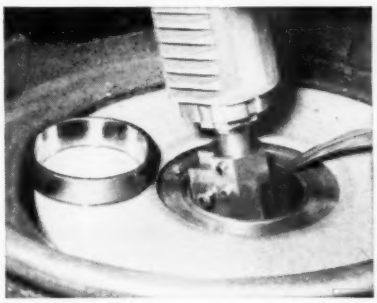
5850 SIZES. If you need a tapered roller bearing smaller around than your finger or as large as 71½" in diameter, you can get it from The Timken Roller Bearing Company.



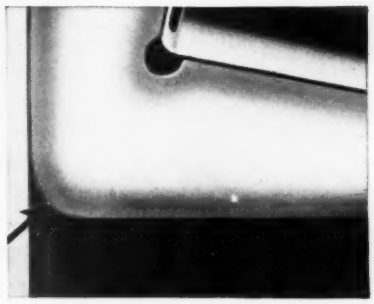
WE MAKE OUR OWN STEEL. Because Timken bearings are made of special alloy steel, produced in the Timken Company's own mills, they have extra strength and wear resistance.



RIB OF CONE maintains roller alignment, prevents skewing, assures maximum bearing capacity.



PRECISION MANUFACTURE makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.



GENEROUS RADIUS on the inside diameter of Timken bearing cones permits greater shaft strength.

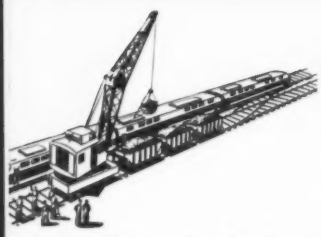
No other tapered roller bearing gives you all the advantages you get with Timken bearings. Be sure every tapered roller bearing you use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION ✳

With D Tournapull...

it's an hour used instead o



How much of your maintenance budget did you spend last year for work train service plus wasted waiting time while work crews watched the trains go by? Add in, too, the time for loading and unloading, time for blocking to take crawlers over tracks, time shovels sit idle while waiting for trucks or cars.

Estimate your productive percentage and you'll see why more and more lines are putting high-speed, off-track D Roadster Tournapulls on their earthmoving jobs.

One man drives this load-haul-and-spread earthmover anywhere, anytime. The big rubber tires travel by any route . . . along the tracks, over trestles, across yards . . . on the paved highway or the back roads . . . across fields, along the fence, or along the ditch. The scraper bowl easily carries tools, supplies, and extra fuel supply. And, D Tournapull travels at speeds to 28 m.p.h.

For small scattered jobs, the "D" self-loads around 5 yards per trip as a "one-man" dirtmover. When you have volume yardage to move, you bring in a fleet of your D Roadsters, and use a pusher to heap in 7-yard capacity loads. Or, these Tournapulls can work in pairs, push-loading each other with attached LeTourneau, front-mounted dozer blades.

Whatever your loading method, this is the fastest, handiest off-road maintenance tool ever to hit the railroad field. It will save you more time and more money on dirtmoving assignments than any equipment you've ever put on your budget. Why not investigate? We'll arrange for a demonstration on your Division so you can really see what the "D" can do for you! Send for descriptive bulletin . . . there is no obligation.

R. G. LeTOURNEAU, INC.
Peoria, Illinois

These interchangeable attachments put D Tournapull's 122 h.p. and 28 m.p.h. speeds to work on variety of railroad tasks.

Cutting new berm ditches for Pennsylvania RR, between Thorndale and Morrisville, Pa., D Tournapull self-loaded 4.5 pay yds. of root-matted clay in 120 ft. Average loading time: 54 sec. "D" cut ditch out of bank at high area, hauled 1400 ft. on same side of track, then spread to build up bank in low area. Average speed throughout the 2800-foot cycle was 16.5 m.p.h. On basis of 50-minute efficiency, unit moved 15.7 loads or 70.6 pay yards per hour.

Improving drainage along 53 miles of main tracks for Class One Railroad on Illinois Division, "D" cut back banks 8 to 12 ft., then excavated wide, sloping ditch. Rig easily made sharp, 90° turns in confining area . . . hauled 700 ft. . . . climbed grades to 25%. D Tournapull's ability to produce, even in wet, soft clay and gumbo, earned this comment from Job Superintendent: "Best production tool we have — really moves yardage, especially on long hauls."

d of an hour wasted

On grading job, near Compton, Calif., 2 "D's" teamed up to move 30,000 cu. yds. sandy loam for Contractor S. A. Cummings. One "D" was equipped with bulldozer blade; together they self-loaded and push-loaded an average of 5 pay yds. in ½ minute . . . completed a typical 450' cycle, including grading, in average of 3 minutes.

Building new siding for Reading Railroad, near Harrisburg, a Pennsylvania contractor teamed his "D" with a 93 h.p. pusher. Tournapull has capacity for loading 7 cu. yds. 4-wheel air brakes give operator safe control on adverse grades and winding roads. Low-pressure tires do not trip or damage automatic signal connections.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-99-RR

Send now to: R. G. LeTourneau, Inc., *Peoria, Illinois*

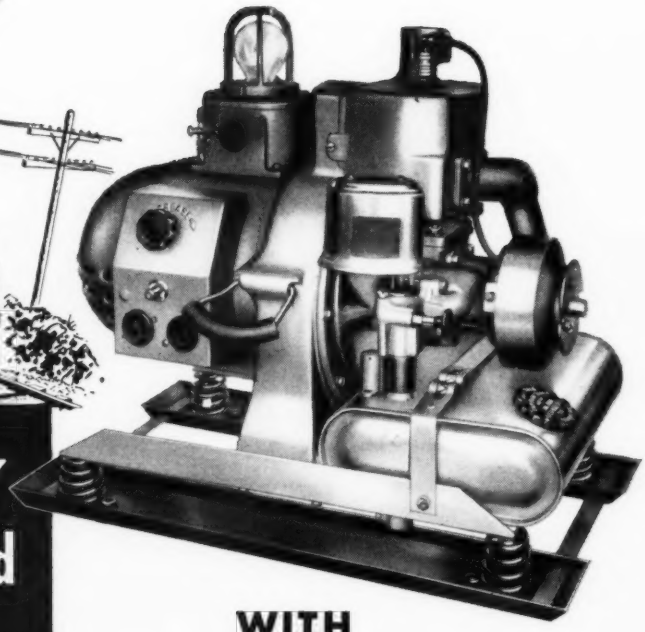
Tell us more about 7-yd., 122 h.p. D Tournapull . . . Also data on:

NAME _____ TITLE _____

COMPANY _____

- ☐ 16-yd. "C"
- ☐ 27½-yd. "A"
- ☐ 42-yd. "A"
- ☐ Interchangeable

LETOURNEAU

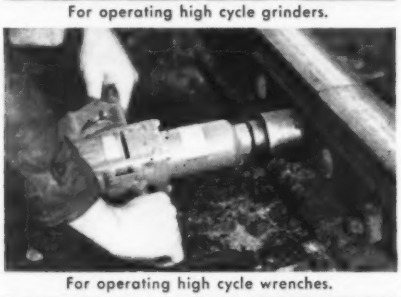


SAVE MONEY
All along the road

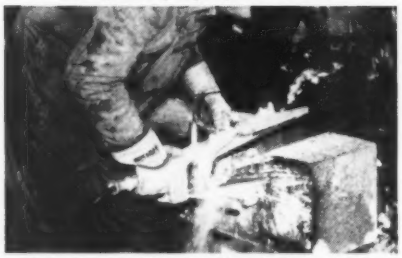
WITH

HOMELITE
Dual Purpose
GENERATORS

For operating high cycle grinders.



For operating high cycle wrenches.



For operating Homelite Electric Chain Saws.

Important savings in maintenance costs are being made these days with lighter weight, more efficient, less troublesome high cycle tools. And the power in back of it all is the Homelite Dual Purpose Generator . . . the first generator of its kind ever developed.

Small and compact . . . easily carryable . . . this gasoline-engine-driven generator gives you high cycle power any place you need it, any place on the road. It gives you all the power you need to operate such high cycle tools as grinders, wrenches, drills and chain saws. What's more, it will also give you all the power you need to operate floodlights or standard 110 volt power tools.

One demonstration will convince you that Homelite Dual Purpose Generators will help to speed maintenance work and cut maintenance costs . . . all along the road. Write and we'll demonstrate, free.

Manufacturers of Homelite

Carryable Pumps • Generators

Blowers • Chain Saws

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE

CORPORATION

1407 RIVERDALE AVENUE • PORT CHESTER, N. Y.

For additional information, use postcard, pages 599-600

WINTER WORK for WEED CONTROL ACTION *Now!*

Left:—Nalco Weed Control Laboratory screenin
experiments provide ideal growth conditions fo
weeds and grasses . . . show new, better ways t
provide complete weed control on your right-of-wa

Below:—Tropical outdoor grass and weed plots giv
Nalco Weed Control Chemicals severest tests unde
actual fast-growing conditions.

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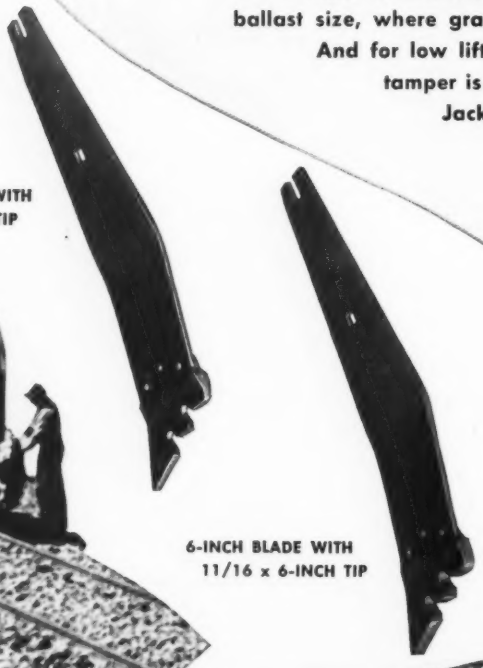
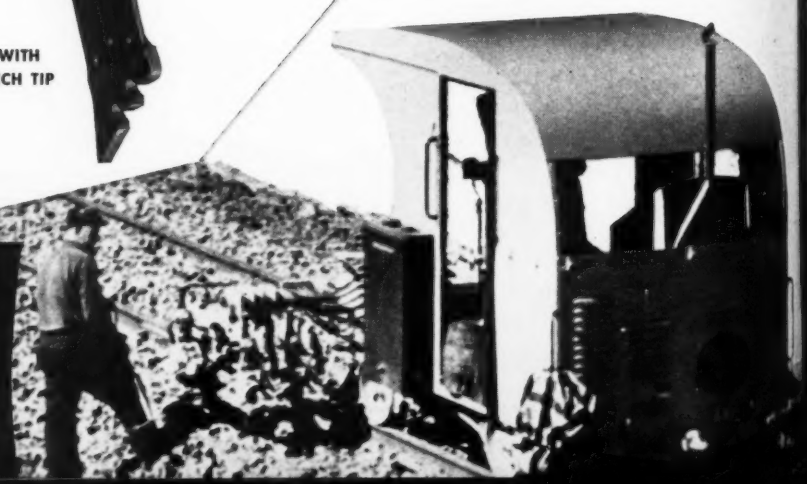


6-INCH BLADE WITH
⅜ x 6-INCH TIP

6-INCH BLADE WITH
11/16 x 6-INCH TIP



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No. 282 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION 79 W. MONROE STREET CHICAGO 3, ILL.

Subject: A New Feature

June 1, 1952

Dear Readers:

Effective with this issue we are inaugurating a new and additional service to our readers, which we hope will prove of interest and value to you. I refer to the "NEWS NOTES..." which you will find printed on tinted stock on pages 543 and 544. I thought you might be interested in having a brief account of our reasons for introducing this feature.

To begin with, it is necessary to point out that Maintenance is a highly specialized magazine in that it deals only with the problems of a particular group of railroad men. Consequently, everyone of the regular departments — editorials, feature, What's the Answer, Products of Manufacturers, and News of the Month — is comprised solely of material of particular interest to this group. In fact, as most of you know, Maintenance is the only magazine in existence that is published exclusively in the interests of engineering and maintenance officers. In short it is your magazine.

At the same time we recognize that, as railroad men, you are interested in and concerned with railroad developments which are outside your immediate sphere of activities. I am thinking particularly of happenings or trends that have a bearing on the welfare of the railroad industry generally, such as important decisions of the Interstate Commerce Commission, federal legislation affecting the railroads, earning reports (past and prospective) of the industry as a whole, forecasts of carloadings, regulations involving the allocation of critical materials to the carriers, etc.

It is to keep you informed of such developments that we have introduced the "NEWS NOTES..." insert which will be a regular feature of each issue from now on. To the end that you will be able to obtain an over-all view of the current railroad picture almost at a glance this feature will, as its name implies, consist of relatively brief items, highlighting the developments. To assure that you will be able to find it easily the material will be printed on both sides of a single sheet of tinted stock and will be placed in the same general location in the front of the book each month. Finally, because we will want the news to be as up to date as possible it will be the last thing to be written before we go to press.

We are inaugurating the "NEWS NOTES..." with the objective of rendering a more complete service to our readers. If you should find it of help in keeping abreast of major trends in the industry generally, our objective will have been realized.

Yours sincerely,

Merwin H. Dick

Editor

MHD:lw

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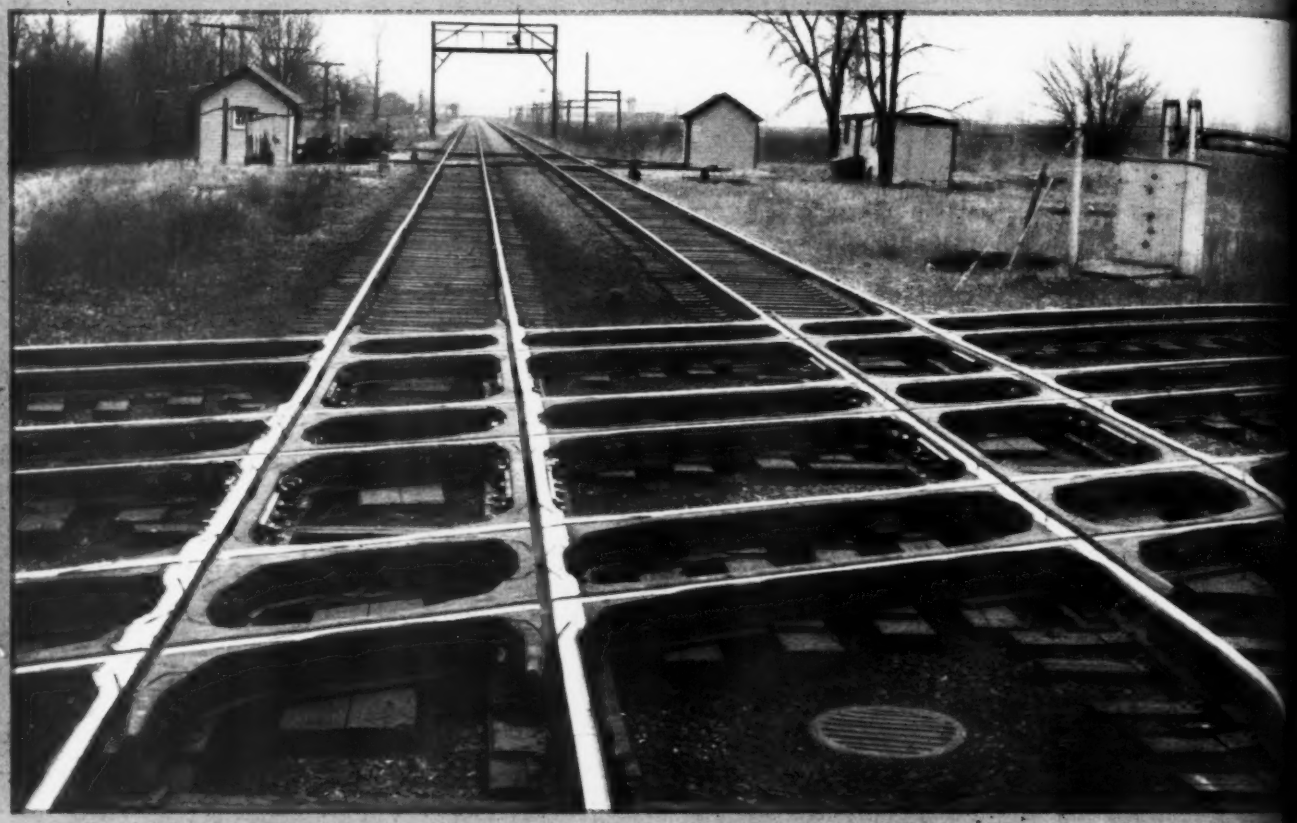

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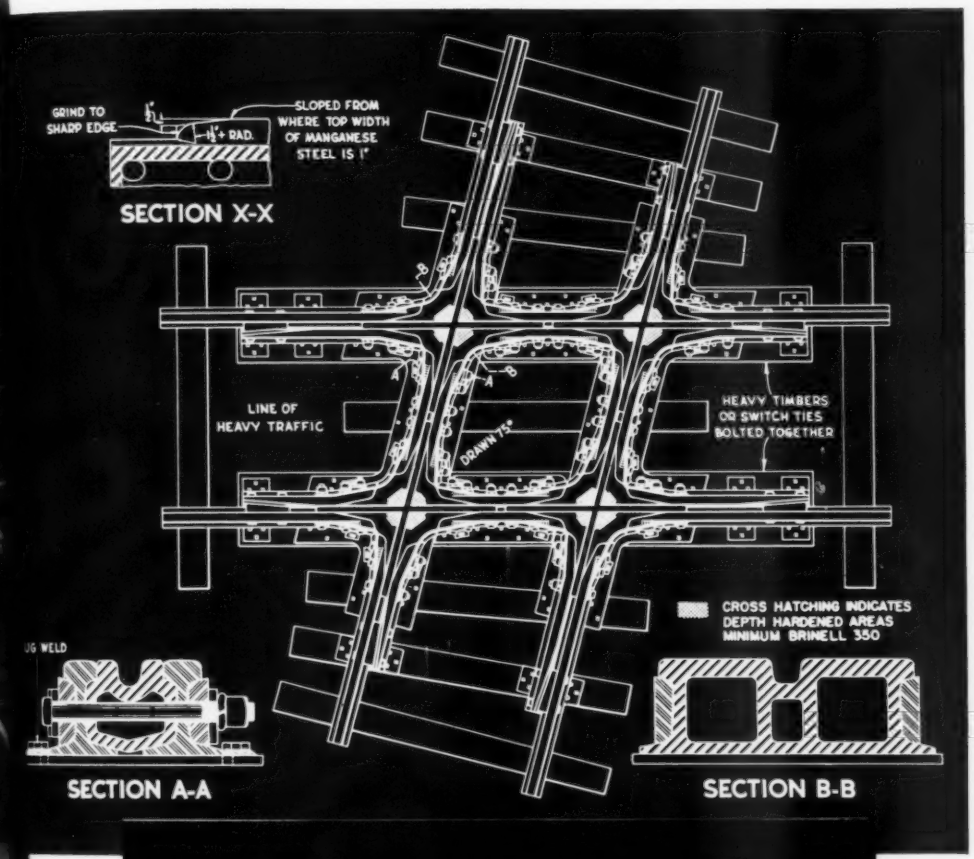

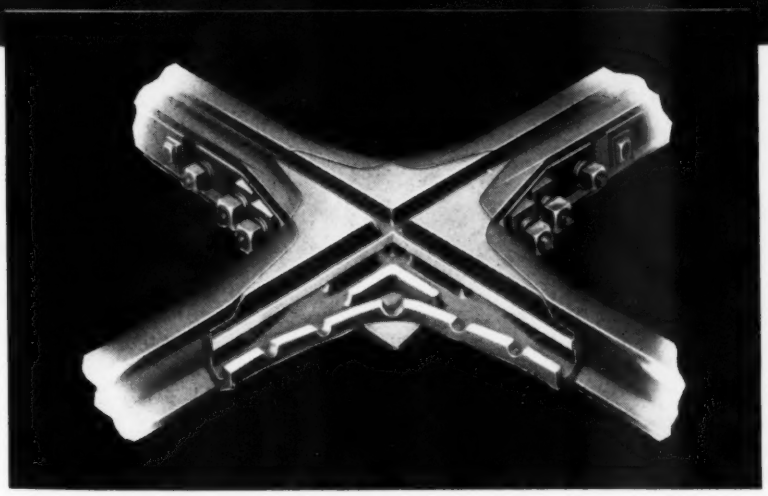

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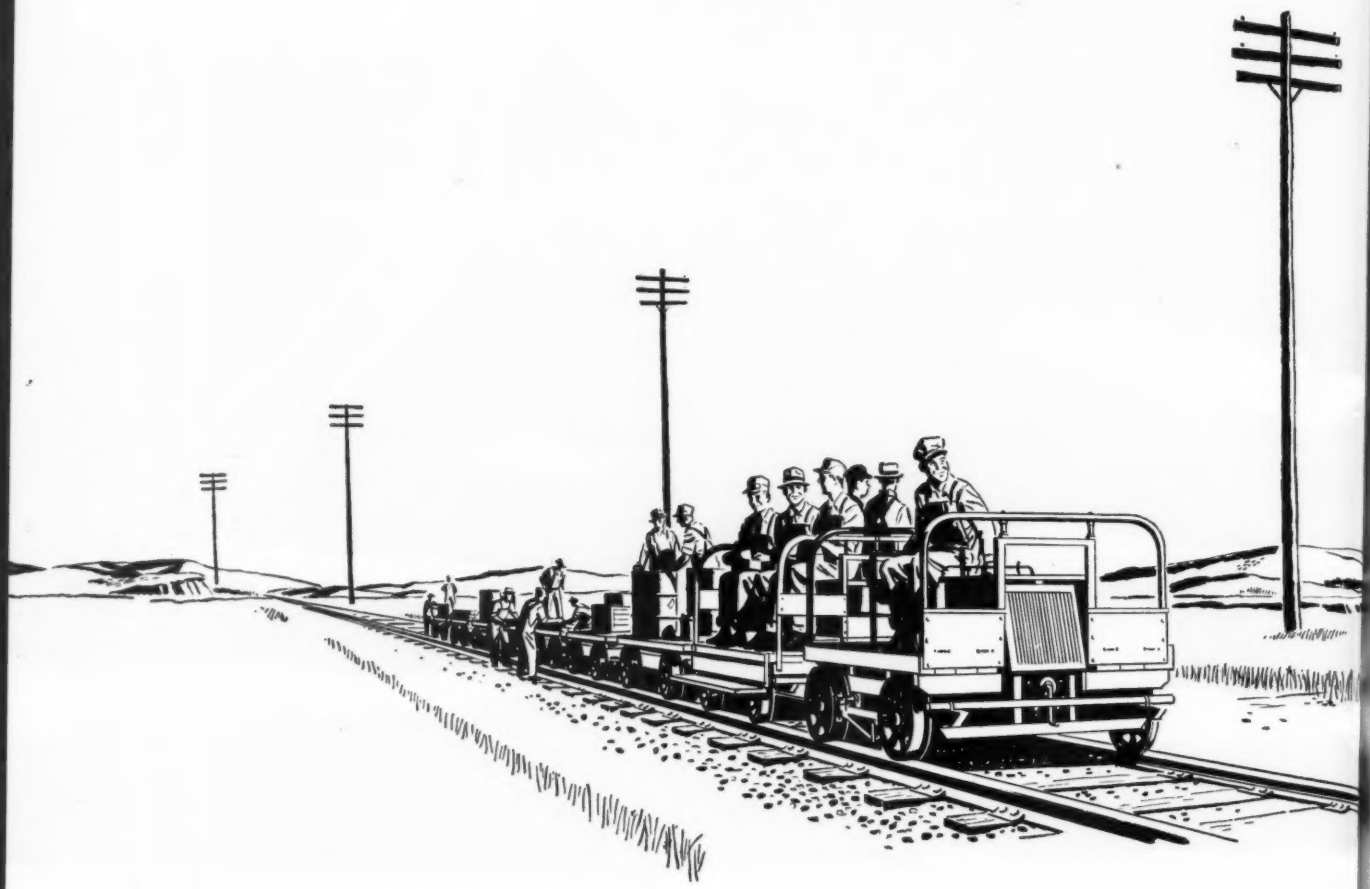

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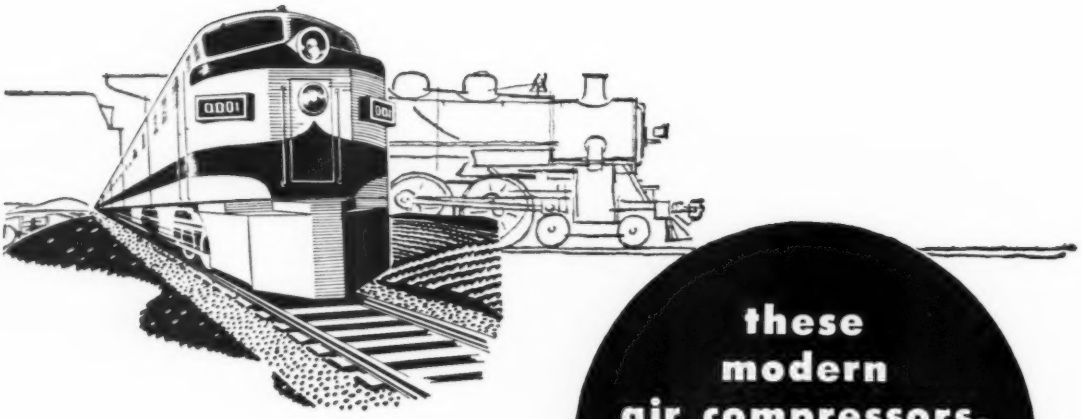

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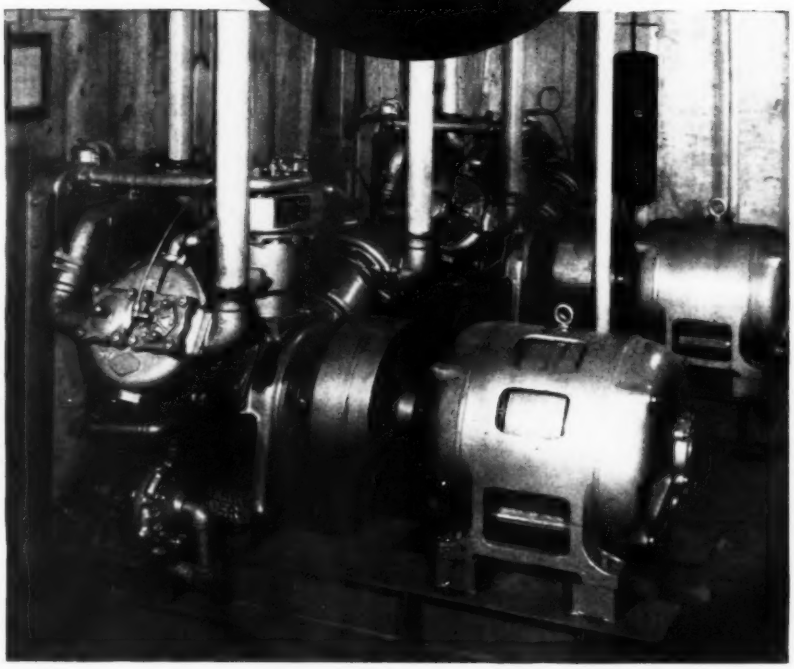

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Service Tests—

Are We Making the Most of Them?

The practice of making service tests to determine the efficacy of new devices on materials is widely used by railroad engineering and maintenance officers. In considering this practice generally there are two principal questions to be answered:

(1) How long should a particular test be continued before a definite evaluation is made of the results?

(2) What action should be taken to assure that advantage will be taken of the availability of new products that have proved their superiority in service tests?

Obviously, there can be no categorical answer to the first question. The length of time the test should run will depend on many factors, such as the character of the product involved, the nature of the structure in which it is used and the conditions of service or wear to which it is subjected. Whatever the conditions may be for a specific test there is reason to believe a tendency exists to prolong the period of the test beyond the time actually required to reach at least fairly accurate conclusions regarding the performance of the product. Is it conceivable that this tendency is preventing the railroads from taking advantage of the services of many meritorious products?

Perhaps of greater importance than the actual period of the test is that a *definite decision be reached on this point* at the time the installation is made. Otherwise the test may run on indefinitely with the prospect that it will be forgotten and the results never properly evaluated or used. Scattered here and there on the railways throughout the country, may be found signs or remnants of numerous long-forgotten service tests which conceivably could have resulted in material benefits to the roads if at least an approximate date had been established in each case on which the results were to be appraised.

Coming now to the second question mentioned above, suppose a service test has proved that the product involved has definite advantages, what then? How many times does it happen that the findings are never put to actual use? Observation indicates that such is the outcome of a large percentage of the service tests made by engineering and maintenance departments. Perhaps the reason is the human failing to resist making changes in long established practices—a failing which, incidentally, is about the most important single factor impeding the march of progress.

Perhaps the answer to this whole problem would be for each railroad to establish definite policies regarding the conduct of service tests and then to insist that they be carried out to the letter. Necessarily, it should be required that a formal report be prepared on the results of each test project. The existence of such a report in the record would be about as effective as anything in bringing about any desirable changes in practices that may be indicated by the results of the test.

Service tests have long fulfilled a useful purpose on the railroads. However, their usefulness would doubtless be greatly enhanced if the reasons for starting them in the first place were to be kept in mind at all times.

SOIL STABILIZATION —

Growing in Its Importance to Railways

MOST railway engineering officers have undoubtedly been aware of the fundamental research underway for a number of years seeking chemical methods of altering soil characteristics to serve better the needs of construction and maintenance engineers. These men may have become cognizant of the field tests and practical uses to which the results of this research have been put in constructing and maintaining roads, airports, and foundations of bridges and buildings. Some of these officers may also have assimilated enough authoritative information to talk intelligently about soil-cement roads, or even the physico-chemical properties of soils.

But there is little evidence that railway engineers in general are keeping pace with the highway, airport and industrial builders in taking advantage of the benefits of chemical soil stabilization. Neither are they participating to more than a minor extent in any of the fundamental research work on soils being carried out. From the worth-while practical benefits being demonstrated by this research, it would appear that the time has come for railway men to realize that the soil on which they build their tracks, bridges and structures has chemical as well as physical properties and can be altered to suit their needs by adding other chemicals to it.

Support for this contention is supplied by the discussions of "Chemical Soil Stabilization" starting on page 588 in the What's the Answer section of this issue. One of these discussions points out that the availability of new chemicals, many of which were themselves developed through research, has intensified further research into soil stabilization. It is through such concentrated research that the main obstacle – high cost – to extensive railway use of chemical soil stabilizers can be overcome. At lower costs the railway use of chemicals to alter and control properties of soils has tremendous possibilities. They might aid in the construction of fills, stabilize slopes, strengthen weak subgrades, or control frost action. Even at present prices, they bear investigation for injection into subgrades and for erosion control.

The possibilities for saving money in the control of erosion with chemical soil conditions are enormous. For years the railways have spent large sums to obtain the proper slopes for cuts and fills and afterward in maintaining them. They have tried scheme after scheme and have found few that would succeed every time at all locations. Slopes have been sodded and staked. They have been seeded with almost every known herbage from blue grass to kudzu. They have been coated with heavy layers of cinders and rolled. None but the last has proved entirely successful and now increased dieselization has threatened the cheap supply of cinders.

Perhaps, at last, synthetic chemicals will save the day. In view of the worth-while practical benefits of such materials as demonstrated through research and by test, the railways should surely wait no longer; they should get on the chemical-soil-stabilization bandwagon now, at least to the extent of investigating the possibilities thoroughly.

STATION SIGNS —

Should Be Visible to Train Passengers

THERE probably is nothing more exasperating to a traveler than not to know where he is. Everyone likes the comfortable feeling that comes from being master of his destiny without any uncertainty, yet the feeling of anxiety is just what a stranger senses on some railroads where the brakemen fail to pronounce the name of the next station clearly and where station signs are not readily visible from trains. Station signs are supposed to be for the benefit of train passengers but in many instances it would appear that their main function is to satisfy the civic pride of the townspeople.

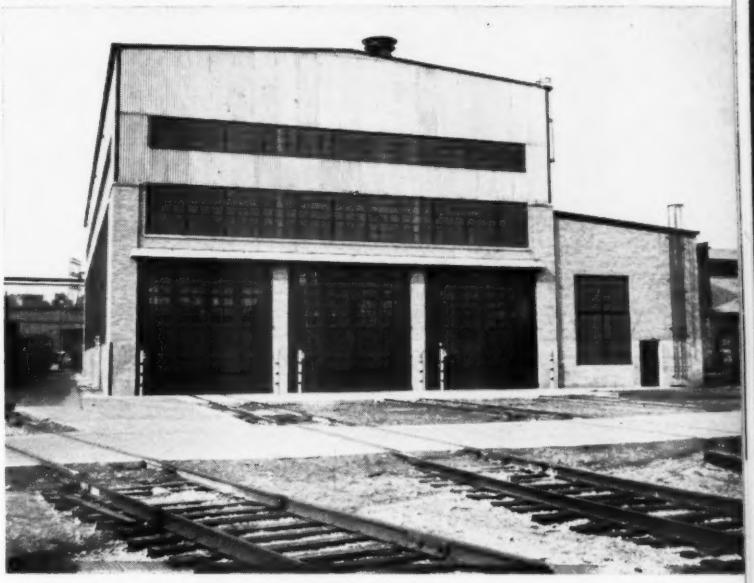
Most railroads have standards relating to the style, size and coloring of the letters that are to be used on station signs, as well as prescribing that such signs be mounted at each end – and sometimes on the track side – of station buildings. But no particular consideration seems to have been given by some roads to the placement of these signs. Many are actually in recesses formed by wide eaves which obscure them from view unless the observer is almost at right angles to the signs. And this angle of vision is seldom obtained by passengers seated in cars.

For the most part, however, the greatest fault in placing these signs stems from mounting them too high. On single-track lines, a traveler on the off-station side of a car frequently cannot even see the station, and, if he can, he sometimes finds the shades drawn so low on the windows of the stationside of the car that he cannot stoop low enough to see the sign.

It should be significant that the station signs most easily observed by the passengers are those at tiny hamlets where the station name is shown on a board bolted crosswise to a post. These signs are usually only 8 to 10 ft. high as compared with those on station buildings at heights of 12, 14 and 16 ft. Also, the post signs are generally set some distance away from the track so that the time in which a passenger has to observe the name is lengthened to more than a glance.

Much of a passenger's anxiety could be relieved by the railroads placing more signs at a station. This is a conclusion reached long ago by the urban transit lines and on these lines the passenger can only be carried a short distance past his proper destination. It is much more important for the passenger to know where he is on a railroad.

Left—The boiler shop before it was dismantled at Minneapolis, Minn. Below—The same building as it appears today at Milwaukee, Wis. All structural members were marked for identification to aid reassembly



Old Boiler Shop . . .

Begins Diesel Career in New Location

By dismantling an old shop building at Minneapolis, Minn., and re-erecting it at Milwaukee, Wis., the Milwaukee road placed a heavy-repair diesel shop in service about a year earlier than would have been possible by ordering and waiting for the delivery of new material.

• Ever have to build a structure that is urgently needed and wonder how you can get the steel and other material to do it in less than a year? That was the situation that the Chicago, Milwaukee, St. Paul & Pacific faced when it wanted to build a heavy-repair diesel shop at Milwaukee, Wis., in 1951. The problem arose when it was learned that it would take about nine months to get delivery of the structural steel and from 18 to 24 months to get delivery of an overhead crane.

It was natural to think of utilizing any structure formerly used for maintaining steam power for the new shop building, but, since Milwaukee is the main heavy-repair and maintenance shopping point on the system, all buildings there in steam locomotive service were still needed for repairing and maintaining the steam power still in use. In the Minneapolis terminal, however, there was an old steam locomotive boiler shop, 65 ft. by 200 ft. in plan, which had now become superfluous. Hence, since it was not desirable to handle diesel repairs at that point, it was decided to dismantle that structure and re-erect it at Milwaukee, 335 miles distant.

The road already had a shop in Milwaukee for handling the running repairs and general maintenance of its diesel locomotives. Since that shop contained a drop table, it was decided not to install another one in the new heavy-repair shop. Whenever it became necessary to remove trucks from diesel units being shopped for heavy repairs, the trucks could be removed on the existing drop table and the diesel units moved to the heavy-repair shop on track dollies. Also, since the Milwaukee already had a large electrical repair shop located near the existing diesel running repair shop and near the proposed site of the heavy-repair shop, it was decided to handle the repairs of generators, traction motors, and other electrical diesel equipment there instead of providing space and equipment for electrical repairs within the new diesel shop. With this arrangement, the size of the relocated building more nearly sufficed for the purpose.

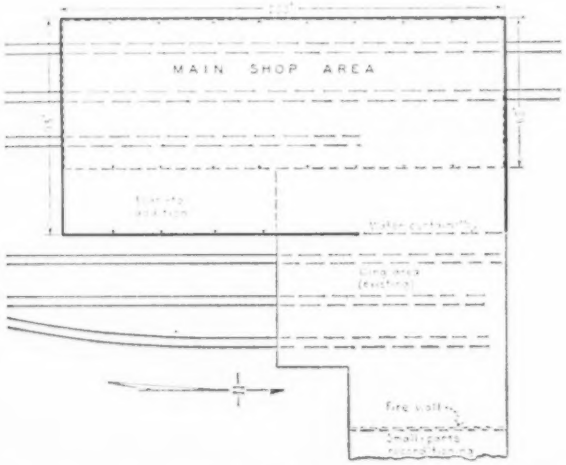
Old Structure Dismantled

The boiler shop building in Minneapolis, although built in 1913, was structurally sound. It consisted of a brick and steel building having a single high bay. Fenestration in the sidewalls was almost continuous. It also contained a much-needed overhead crane of 30 tons capacity.

It was planned to reuse the entire building, and for the most part this was done. The overhead crane, all structural steel, lighting wiring and fixtures, roof ventilators, and blast heaters were salvaged and re-used. But the roof deck was so badly damaged during the dismantling work, and so many of the window sash were broken, that these materials could not possibly be re-used for the new building.

All steel members were marked as to their location before dismantling so that they could be re-assembled without difficulty. Dismantling work was carefully carried out, rivets being knocked out where necessary and

Since the foundation for the new structure was laid during the dismantling at Minneapolis, erection began as material arrived



Plan of new shop. Dashed line indicates outline of old building

Courtesy Minneapolis Morning Tribune

J. P. Kiley, Milwaukee president, inspects dismantling work

the steel roof trusses being cut in half at the construction joints to facilitate loading and transportation on cars. All steel was reconditioned by cleaning and painting so that, when it arrived at its new erection site, its condition was almost as good as newly fabricated steel.

The dismantling work was done by railway forces. It was started in April 1951 and was completed in five weeks.

New Building Is Enlarged

While the dismantling work was being carried out in Minneapolis, the foundation work—concrete piers and walls supported on creosoted timber piles—for the new structure was started in Milwaukee. The concrete foundation was carried up a little higher from the floor line in the relocated building than formerly to afford more headroom for the crane. Also, more room than that provided by the relocated structure was needed to provide sufficient floor area for handling the diesel repair work.

This problem was solved by building a lean-to addition and by locating the new structure near an existing small-parts reconditioning building so that a large room in that building could be used to form a wing about 100 ft. long by 110 ft. wide. The lean-to addition, approximately 28 ft. wide by 90 ft. long, was constructed along the wing side of the relocated structure. The structural steel for the lean-to, as well as for bridging the gap between the relocated structure and the existing building, consisted of reconditioned second-hand bridge steel that was on hand at the company's main reclamation point.

Commercial projected steel sash, three panels high, was used to replace the former sash. Common brick was used from the foundation to the underside of the windows, but was carried up to the top of the fenestration at the corners of the building. Above the fenestration, corrugated asbestos-cement siding was used. New rolling steel doors were installed at the north end of the new structure where unusually wide openings were

Lean-to addition was constructed on one side of the building to provide additional room for the repair of diesel engines

needed because of track curvature, while wood bifold doors were used at the south end.

Inside the building, three 20-ft. jib cranes, each of 3 tons capacity, were hung on columns to serve the lean-to area which was assigned to the repair of the diesel engines. Also, an office, enclosed on three sides by large glass panels, was provided at mezzanine level at the north end of the building where the foreman could view all operations both in the main shop and in the wing. The three blast heaters recovered at Minneapolis were re-installed in the relocated structure and these units were supplemented by manually-controlled grid-type unit heaters placed at a lower level on the sidewalls.

Fire Protection Arrangement

The large room taken over for a wing to the new diesel shop had brick walls at both ends, one being a firewall and the other being an exterior wall of which a large portion was removed. Normally, the exterior wall would have been retained to comply with code requirements relative to the limitation of floor area between firewalls. But such a wall would seriously interfere with shop operations, so the road substituted a "water curtain" system across this opening. This system, which meets the regulations of the National Fire Underwriters' Code, the State of Wisconsin Building Code, and the Building Ordinance of the City of Milwaukee, is of the deluge type.

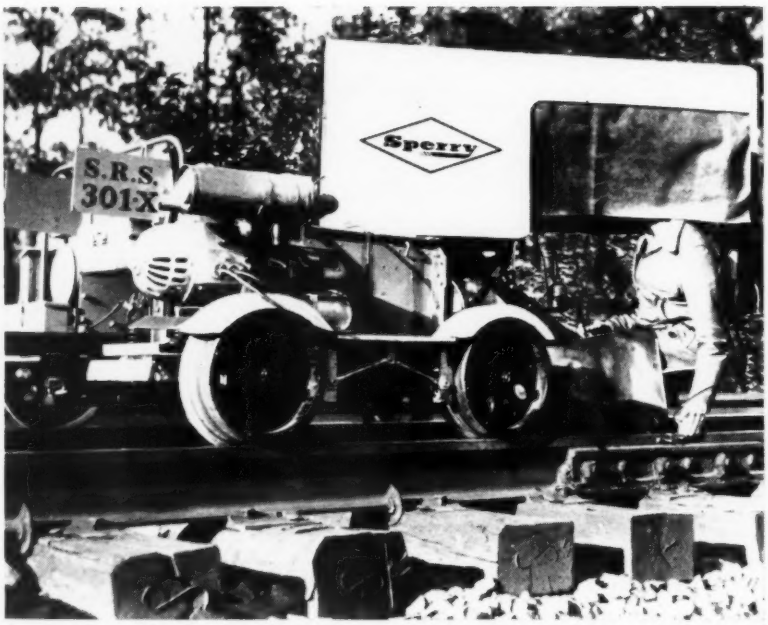
In the event of a fire, this system produces a curtain of water across the opening. It consists of several heat-actuated devices, known as heat detectors, which are hung at roof level and which are connected by air tubing of small-diameter copper to an automatic release on a deluge valve. The copper tubing is enclosed in steel tubing for protection. Open-type sprinkler heads are mounted on a water pipe suspended directly beneath the steel girder that spans the opening. The pipe line is connected to a high-pressure city water main by means of the deluge valve.

The pipe line from the deluge valve to the sprinkler

The roof deck, steel sash windows and rolling doors were new

heads is normally dry. Normal atmospheric temperature fluctuations do not actuate the system, but any appreciable rise in temperature, as would result in the event of a fire, causes a raise in the air pressure within the copper tubing, which in turn releases the clamp holding the deluge valve gate and allows the city water to pour out through the line and sprinkler heads. This system is also connected to the general fire-alarm system of the shop grounds so that other fire-fighting equipment can be brought to the building when needed. In addition, a "trouble" alarm is provided so that any reduction or lack of pressure in the main city water supply line will be made known in advance, permitting proper steps to be taken.

All work involved in constructing this shop was done under contract and was carried out under the general direction of W. G. Powrie, chief engineer, and under the direct supervision of K. E. Hornung, architect.



Supersonic rail flaw detectors such as the Branson Audigage (left) and the Sperry Ultrasonic detector car (above), are rapidly becoming important maintenance tools

Supersonic Testing of Rail Ends...

Adapted from a talk presented at the recent A.R.E.A. convention under the sponsorship of the Rail committee, of which the author is now chairman, this article outlines the expanding use and effectiveness of this relatively new method.

• Indicates potential service failures
• Points out many lesser defects
• Shows growth of web cracks

By C. J. Code
Engineer of Tests, M.W.
Pennsylvania
Philadelphia

• Supersonic inspection of rail ends for defects is only a little more than two years old, but in that time it has made an important contribution to the safety of railroad track, in spite of the fact that service failures within the joint-bar areas seldom result in derailments. At the present time, all of this type of rail testing is being done by either of two testing devices, both of which were offered to the railroads at about the same time. One of these is the Audigage flaw detector, manufactured by the Branson Instruments Inc., and the other is the Ultrasonic detector car, operated by the Rail Service Division of Sperry Products, Inc. Both devices have been successful in locating both upper-fillet and bolt-hole cracks in rail ends within joint-bar limits.

In addition to the inspection of rail ends in open track and of (full-length) rails through highway crossings, the supersonic method has been used for inspecting rail ends in railroad crossings and in heels of switches. It has also proven its value in this field.

I am told that there are now 130 Audigage flaw detectors in service on 42 different railroads. The maximum number on any one railroad is 28 instruments, and 8 railroads have purchased 5 or more. We have 13 on the Pennsylvania and have 2 more on order.

Sperry Rail Service Ultrasonic testing has also been used by a great many railroads and I am told that they tested nearly 700,000 joints in 1951 and located approximately 12,000 defects. Of these about 4,500 occurred between the heads and webs and 6,500 at bolt holes while 1,400 consisted of defective welds or miscellaneous defects.

On the Pennsylvania in 1951, we tested 89,700 joints and located 3,400 defects, resulting in the removal from track of 1,487 rails. In addition to this we inspected 5,444 highway crossings and removed 417 defective rails from them. We have not classified our defects into those that occur in the upper fillet, or at the first bolt hole. Another eastern railroad in the first six months of 1951 tested 72,000 joints on one of their two regions, locating 2,444 failures, of which 1,008 were at bolt holes and 1,429 in the upper fillet, with 7 miscellaneous

defects. A large western road tested 717,000 joints, removing 684 rails as a result of such inspection. Of these 266 were bolt-hole failures, while 418 were head-web separations. These last two roads used both Audigage and Sperry methods.

Any new development such as this calls for the design of a new set of reports in order that an adequate record may be kept of the results obtained. We have required our regions to record the total miles of track tested, the total joints inspected, total defects indicated, the defects verified by removal of joint bars and the total number of rails removed from track. On this report, so far, we have not distinguished between bolt-hole failures and upper-fillet cracks, but will do so in the future. There is an A.R.E.A. questionnaire being circulated at the present time which requests that reported rail-web failures in the joint be classified as bolt-hole failures, upper-fillet cracks or head-and web failures, all subdivided into service and detected failures. Such a report will probably become a part of A.R.E.A. rail statistics in the immediate future.

How Fast Do Cracks Grow?

No information that we have to date gives us any true indication of the rate of growth of cracks. Ordinarily we have not kept any records of the exact location of rails left in track with minor defects, but have kept such a record on two test miles of track during the past year, making a recheck after an interval of 12 months. This recheck showed the following results.

Inspection of 200 joints in 152-lb. rail in January 1951 showed long cracks in 10 rails which were removed, and small cracks of 1 in. and less in length in 35 rails, all of which were left in track. Inspection of the same track in November 1951 showed that one of the 1-in. cracks had grown to 7 in., but that no new cracks had developed.

At another location in January 1951 an inspection of 208 joints in 152-lb. rail showed long cracks in three rails which were removed, and short cracks in 26 rails which were left in. Prior to reinspection, there was a service failure (bolt-hole crack) in a rail which previously showed no defect. Subsequent inspection in November 1951 showed two rails with 1-in. cracks which had grown to 8 in. whereas the defects in all other rails had not changed.

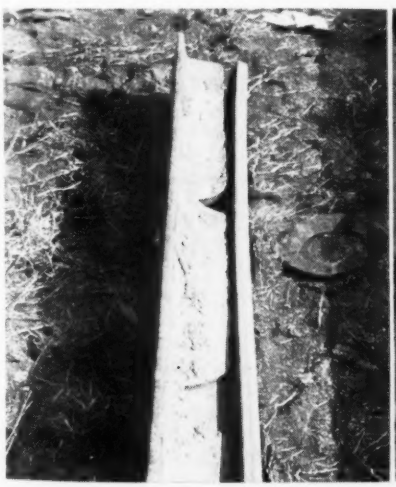
What Size Crack Is Unsafe?

Removal from track of all rails which show defects under the Audigage or the Sperry Ultrasonic car does not appear to be necessary. In fact, most railroads find small defects in such large numbers as to make their removal entirely beyond the limits of reason. Various criteria have been adopted for determining the limits of cracks which shall be allowed to remain in track, but good judgment must be exercised in any case by a track foreman examining the defect. Most engineers seem to feel that it is unnecessary to remove rails from track with head-and-web cracks less than 1 in. in length or with bolt-hole cracks less than ¼ in. in length.

It is my personal opinion that safety is better served by making rather frequent rechecks of stretches of track which have many rails with small defects rather than by wholesale removal of a large number of rails having very small defects. In some cases a recheck at intervals of one year may be sufficient, in other cases a recheck may be desirable at intervals of six months or three months, or even less. This will depend on the record of service failures, the traffic and other local conditions. It seems to be desirable to recheck at frequent intervals after applying reformed or oversized bars which change the stress situation in the rail ends.

Consideration will no doubt be given in the future to keeping a record of the exact location of all small defects left in track, so that their growth may be followed. We would suggest that each interested railroad set up such a record for at least several test stretches.

Some engineers have indicated that they feel that the use of inspection instruments for locating defects in rail ends is unnecessary, or is undesirable in view of the problem presented by the large number of small defects found. The illustrations accompanying this article show some of the types of defects found and removed from track. These may serve to convince some otherwise skeptical people as to the desirability of such inspection.



This striking example of web-head separation was found by visual inspection

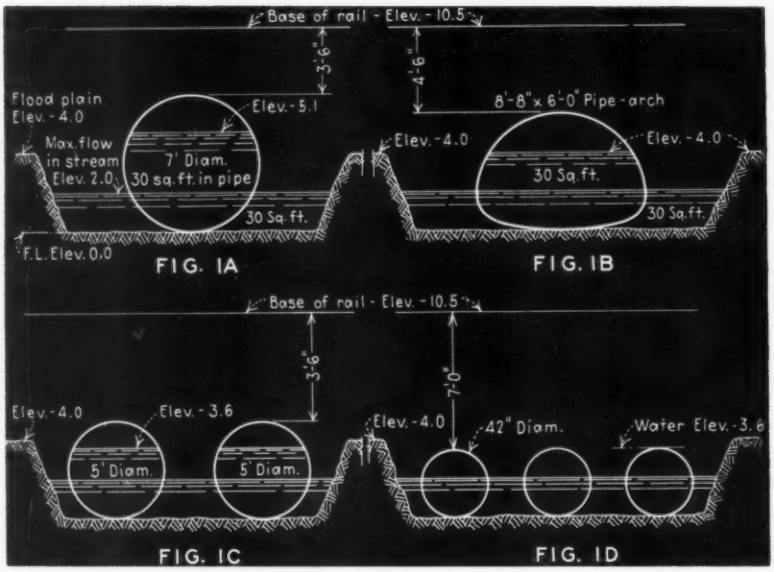
An extensive bolt-hole crack that was detected by the Audigage flaw detector

This rail, taken from a highway crossing, was found by Audigage inspection

Pipe Culverts for Meeting Varying Drainage Needs

By George E. Shafer
Chief Engineer
Armco Drainage & Metal Products, Inc.
Middletown, Ohio

Railway engineers must frequently choose the type of culvert that will best suit local conditions. This article, originally presented in answer to a question discussed in the What's the Answer section of the May issue, cites some considerations involved in adapting pipe culverts to the problems met at a particular situation.



Shown in this diagram are different arrangements of culvert pipe which may be adapted to meet various conditions encountered in designing drainage installations

• For railway culverts a single line of pipe is preferred to multiple lines because it is usually more economical and is hydraulically more efficient. However, under some circumstances installation of a single pipe is impracticable. For instance, the railroad embankment may not be high enough to provide adequate earth cover for the extra-large single pipe required to carry the flow. Under other circumstances a suitable single pipe may have to be so large in relation to the depth of the streambed that, by the time the water has reached the required depth in the pipe, a large area above the banks of the stream is flooded.

In Fig. 1A, which illustrates such a case, the streambed elevation in feet is 0.0, the streambank, 4.0, and the base of rail, 10.5. Let's suppose that the maximum stream depth is 2 ft. with a corresponding area of 30 sq. ft. In designing a pipe culvert to fit these conditions, we must start with the minimum cover desired. Since this is usually considered to be ½ the diameter of the pipe, we therefore know that the largest single pipe that could be used is 7 ft. in diameter. With such a pipe, the water would have to be at an elevation of 5.1 ft. or 1.1 ft. above the stream banks. This is objectionable in that it would flood fields and give cause for damage claims.

To avoid this disadvantage of a single pipe installation, there are two alternatives. First, a structure such as the pipe-arch shape may be used as shown in Fig. 1B. This type of culvert offers two major advantages: (1) The required depth of flow is just within the stream banks; and (2) the cover is more than adequate. Furthermore, the wide opening in the lower portion of the pipe-arch allows free flow of low stream stages without the upstream ponding necessary to gain the cross-sectional area equal to a single round pipe.

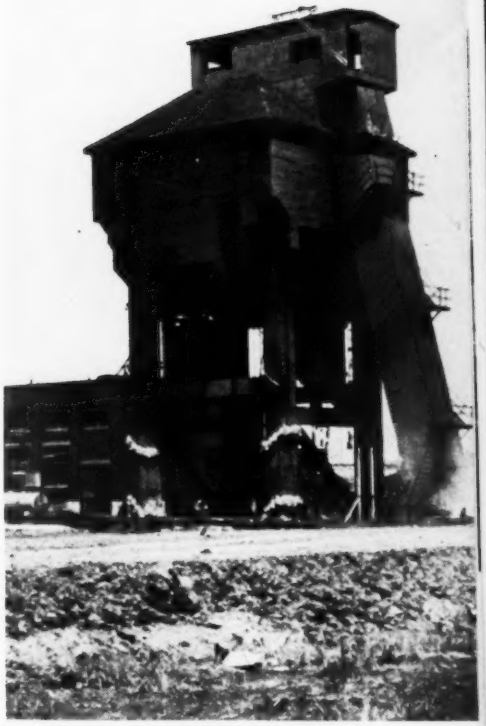
As a second alternative, more than one line of pipe or pipe-arch may be used as shown in Figs. 1C and 1D. The three smaller structures not only cost more and are hydraulically less efficient, but are more subject to clogging. Therefore, they require more maintenance. Where embankments are low and streambeds are shallow such multiple structures are frequently necessary. In cases where such streams carry large amounts of debris, trash racks built well away from the pipe entrances will minimize the maintenance necessary to prevent clogged openings.

Installation of multiple culvert pipe is often necessary where embankments are low

Combine Dynamite and Skill in Dismantling Obsolete Coaling Stations

With legs shattered by small charges of dynamite strategically placed, massive concrete coal chutes on the Southern bend at the knees and bow to dieselization while battering themselves to pieces on the ground.

By T. M. von Sprecken
Assistant to Chief Engineer
Southern, Washington, D. C.



This chute at Atlanta, Ga., was the first to be demolished by the blasting method

• As our planned program for complete dieselization reached 100 per cent on some operating divisions, facilities for handling coal were no longer needed. For a while they were held inactive in prospect that steam would be used for standby service. As more and more diesel units were procured, this need diminished until the coal stations became mere obstructions which had to be torn down.

To date a total of 19 mechanical coaling stations with storage bins, plus seven direct coalers, have been removed. The direct coalers and one timber coal chute presented no serious problems. Seven steel stations with overhead storage were sold to outside parties on condition that they be dismantled and removed from the property. However, the stations of reinforced-concrete construction presented real problems not previously encountered by private contractors or the railway's forces.

No Two Structures Alike

All concrete plants on the Southern System were built, under contracts, by firms specializing in this type of facility. The structural parts were designed by engineers of the contracting firms. Naturally there were structural differences in each design but there were also basic factors common to all of them. All were heavily reinforced. The main mass of the concrete was high in the air, and not easily reached with conventional skullcrackers. Few structures of this kind had ever been taken down, and contractors were wary of undertaking such a job.

The first concrete coal chute to be demolished was located at South Richmond, Va. This was a 500-ton chute built by Fairbanks, Morse & Co. in 1914. It had a rectangular bin supported on 10 columns and an elevator leg. A contractor demolished this chute with a 3,500-lb. skullcracker handled by a truck-mounted crane with an 80-ft. boom.

Decide to Try Blasting

Observation of this work led to plans to tear down the next one with explosives. The original idea was to blast out the legs on one side so that the structure would topple like a felled tree. It was thought that the shock of the bin striking the ground would completely shatter the concrete and facilitate its removal. A study of the structural details showed clearly that the success of this method would depend on preventing premature failure at the top of the back legs. If these legs failed at that point, the chute would collapse in place and not shatter. This factor would be extremely important where a chute straddled an operated track. In each case, a careful study of the layout and surrounding facilities is necessary to determine the best direction toward which to have the structure fall.

The first chute demolished in this manner was a 300-ton structure with circular storage bin at Hattiesburg, Miss., which had been built by the Nicholson Company in 1941. Company forces used a total of 2½ lb. of 50-per cent nitroglycerine dynamite to fell the structure parallel to the track with complete success. Most of the concrete shattered into small pieces which were easily removed.

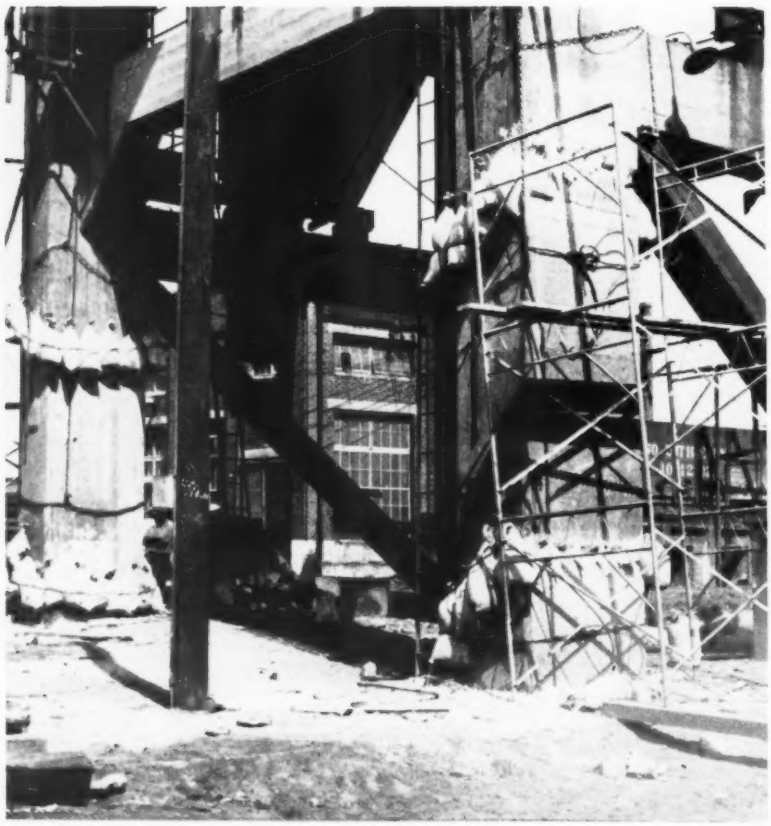
The method of blasting used involved cutting all vertical reinforcing steel in the front legs (in the direction of fall) at the top and bottom, and tightly tamping small charges of dynamite at these points. The charges were arranged to kick out a section of each front leg with a rotating motion forcing the top and bottom of the section in opposite directions. This was done to insure complete collapse on this side. The reinforcing was also cut at the bottom of each back leg and a small charge of explosive was placed at this point. This charge seemed unnecessary and undesirable and was omitted in later operations.

Use of Sand Bags

Sand bags were placed around the shots as a safety measure. These bags effectively prevented the concrete particles from being thrown more than about 25 ft. The small charges of explosives used caused such little noise and shock that

A dynamite blast severs the supporting columns near the base of the chute structure. The tower will now fall toward the left

On the way down. Careful planning and study of the structural features of the chute were necessary to assure a proper fall



All reinforcing rods were cut in the columns on one side of the structure. The dynamite charges were then inserted and sand bags were placed around each charge

no complaints were received. No damage to adjacent property occurred.

Next, the removal of the North Avenue station at Atlanta, Ga., was undertaken. This was an 800-ton chute with a rectangular bin, which had been built by Fairbanks, Morse & Co. in 1925. Its location in the heart of Atlanta, as well as its proximity to several heavily glazed buildings, raised some misgivings about blasting. A concrete contractor offered to remove it for $20,000, and later reduced his offer to $10,000. On the advice of experts of several powder companies, it was shot down at a cost of about $3,500, which included the disposal of the concrete as riprap. A total of only 4½ lb. of dynamite was used on the job.

Careful Analysis Necessary

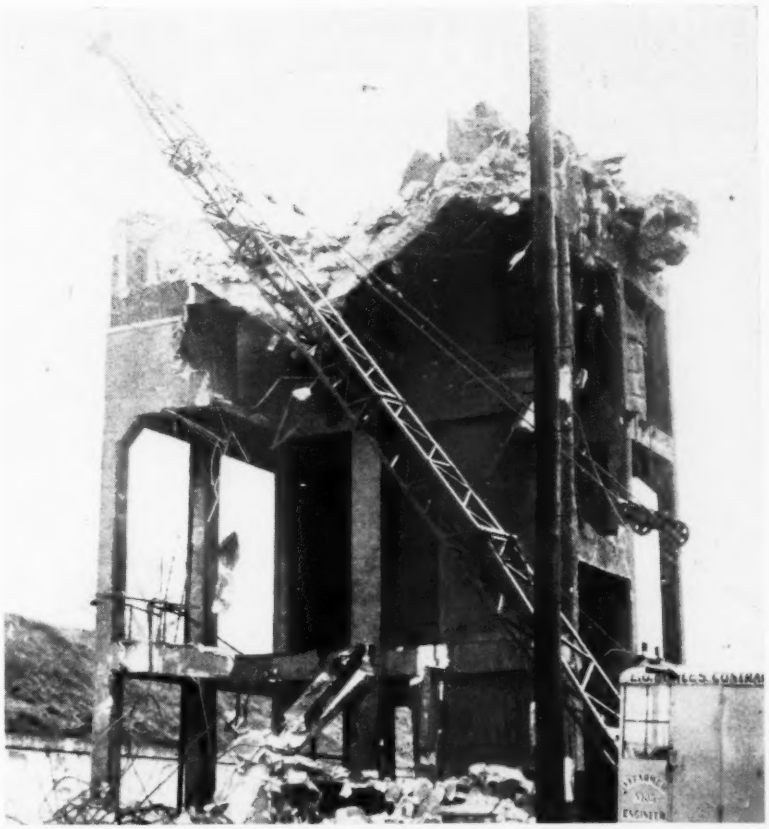
From the experience gained at these points it is anticipated that this method will be continued in future removals of structures of this type, taking full advantage of the lessons we have learned. For instance we know that, to prevent premature collapse, it is necessary to install substantial struts at points indicated by a detailed study of the construction plans. These struts must be securely positioned so they

The fallen monster. All of the debris was easily broken up on the ground and loaded into cars. The entire operation, which required only 4½ lb. of dynamite, caused no damage whatsoever to the heavily glazed building shown at the left

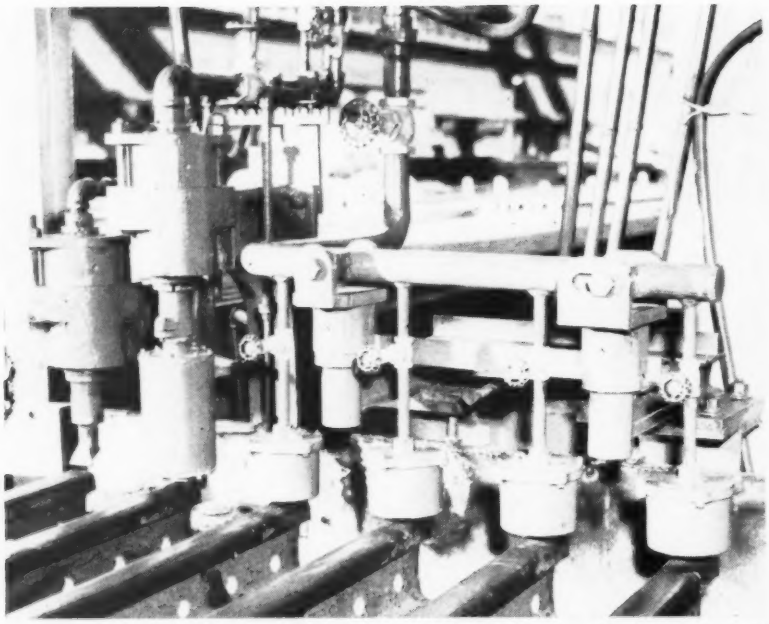
will not be displaced by the blast. In fact, of the 10 concrete coaling stations that have been demolished by the blasting method, at only one was any serious trouble experienced and that was caused by the supports of the temporary struts kicking back.

Analysis of plans generally shows that the haunch at the junction of the tops of the colums and the bin is reinforced to take wind loads but not to support the cantilevered weight of the chute when support on one side is suddenly removed. Thus, temporary struts are needed to hold the joint rigid until the toppling of the chute is well on its way. The undesirable kick-back of the struts can be prevented by placing the base of the struts as low as possible, usually at the base of the back column.

Finally, we have found that the success of the blasting method depends on detailed study and careful planning. No two of our structures or localities were alike, and individual plans had to be made for each location. With the help of experts of the powder companies who were consulted in all cases as to the kind, quantity and position of the explosive to be used, only relatively small amounts of dynamite were required and no personal injuries occurred.



The first concrete coaling chute to be torn down, a 500-ton structure at Richmond, Va., was demolished using a 3,500-lb. skullcracker handled by a truck-mounted crane



Four burners at the right pre-heat the rail ends to 1000 deg. The larger element raises heat to 1600 deg. Cold air at 100 p.s.i. performs quenching process (left)

Flow rates of both air and gas are periodically checked to assure uniform heat

Precision Process for Rail-End Hardening

This panel of automatic vernier controls is the heart of the system. At predetermined intervals these controls activate the hydraulic conveyor mechanism which positions rail ends

• A new process is now being employed at the rail mill of the Colorado Fuel & Iron Corp. at Pueblo, Colo., for the purpose of obtaining uniformity of pattern, location and hardness in the end-hardening of rails. This process, which is automatically controlled throughout, employs a series of Selas radiant burners under which the rail ends pass on a hydraulic conveyor system.

The hardening unit consists of a series of five burners and an air-quenching device under which the rail ends are positioned for predetermined periods of time. The rail ends are first heated to a temperature of approximately 1,000 deg., by passing them successively beneath four pre-heating burners, and then are raised to a temperature of 1,600 deg., under a larger burner. The entire operation is accomplished in a protective atmosphere. The final step, quenching, is done by subjecting the rail ends to a blast of cold air under a pressure of 100 p.s.i.

The hydraulic conveyor system is automatically controlled by electric timing devices that maintain the proper conveyor speed essential for correct temperature control of the rail ends.

Features Positive Control

The new method is claimed to provide positive control of the metallurgy, sectional dimension and physical characteristics of the heat-treated portions of the rails. In addition to the electric control of heating time, heat intensity is controlled throughout the process by a precision air-gas mixing system, wherein flow rates of both air and gas are checked and recorded periodically.

The area hardened by this process covers the full width of the rail head and extends back 1½ in. from the rail end. The treated zone is a minimum of ¼ in. in depth, and possesses a Brinell hardness of from 331 to 401.

The end-hardening of rails was first started at this mill in 1935 and was continued until the outbreak of World War II. The process employed at that time incorporated an old-fashioned "heat gun," which was timed by a sand glass in order that each rail end might receive three minutes of heat treatment. Lack of uniformity and absolute control led to the abandonment of the process and the installation of the new unit.

Representing the Chesapeake & Ohio—H. M. Harlow, asst. gen. supv. b. & b. and M. J. Hubbard, gen. supv. b. & b.

Frank H. Fischer, Koppers Company; R. R. Poux, ch. treat. insp., Erie; H. L. Belter, gen. str. keep., Lehigh & New England; W. F. Fegley, treat. insp., Delaware, Lackawanna & Western; L. Perez, Forest Products division, O.P.S.

Railroaders Were Active At A.W.P.A. Meeting

Many railroad men took part in the annual convention of the American Wood-Preservers' Association. Of particular interest to railroad representatives was an address by L. T. Nuckols describing the experiences and practices of the Chesapeake & Ohio in connection with the use of treated wood.

L. T. Nuckols, ch. engr., C. & O., discussed railroad uses of treated wood

• In keeping with the continuing importance of treated wood on the railroads, their representatives, as usual, took a prominent part in the proceedings of the forty-eighth annual convention of the American Wood-Preservers' Association, which was held at the Hotel New Yorker, New York, April 22 to 24, inclusive. Railroad men attending this meeting participated both as speakers, as session chairmen and coordinators and as interested listeners from the floor of the convention hall.

During the three-day meeting there were five technical sessions, each of which had a session chairman and a session coordinator. Railroad men acting as session chairmen were W. F. Dunn, Sr., tie and timber agent, Southern, Washington, D. C., and A. S. Daniels, Texas & New Orleans (Southern Pacific Lines in Texas and Louisiana), Houston, Tex. Railroad men acting as session coordinators were G. B. Campbell, tie and timber agent, Missouri Pacific, St. Louis, Mo., and J. S. Giddings, assistant manager treating plants, Atchison, Topeka & Santa Fe System, Topeka, Kan. Still another contingent of railroad men appeared on the program as chairman of technical committees.

In the 15 addresses and 28 technical committee reports presented at the convention practically nothing was said that wasn't of direct or indirect interest to railroad users of treated wood. However, two addresses were presented that were of particular interest to this segment of the audience. One of these was an address by L. T. Nuckols, chief engineer, Chesapeake & Ohio, Richmond, Va., who spoke on "Diversified Uses of Treated Wood on Railroads," while the other was a paper by F. R. Denney, assistant mechanical superintendent, Texas & Pacific, Dallas, Tex., on "The Use of Treated Lumber for Railway Car Repair and Construction."

Treated Wood On the C. & O.

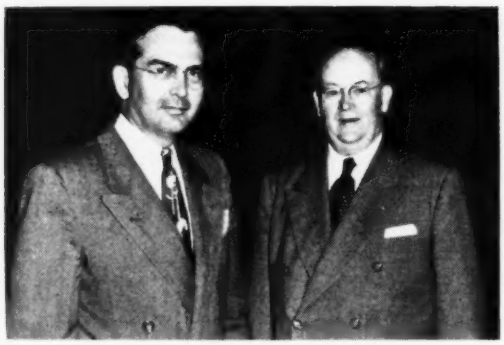
As an indication of the extent to which treated wood is used on the railroads, Mr. Nuckols said that creosoted pressure-treated materials have been used by the Chesapeake district of the C. & O. for about 69 years for pier piles and timbers, and since 1916 for crossties, bridge ties, timber-frame and pile trestles, bulkhead timber, switch ties, poles, fence posts and miscellaneous structural lumber. The use of treated materials on the C. & O. for all these purposes was traced in some detail by Mr. Nuckols, and figures were presented to show how the railroad has benefitted through the increased service life of its ties and timber structures.

Considerable service life has been added to bridges and structures, said Mr. Nuckols, by the practice of preframing and boring lumber and timber before treatment. Bridge-tie framing on the C. & O. dates back to 1926. The preframing of all timber trestles was started in 1930. At that time the railroad began using the lap-chord stringer design which gives a full bearing of the stringers on the

G. B. McGough, Bond Brothers, and C. D. Turley, engineer ties and treatment, Illinois Central. Mr. Turley is chairman of Committee U-3, Tie Service Records

R. D. Simpson, maintenance engineer, Norfolk & Western; W. B. Strombock, supervisor timber preservation, Lehigh Valley; and Carl Wingerson, Oliver Iron & Steel Corp.

R. B. Hawk, T. R. Miller Mill Company; W. A. Jones, Jr., United States Steel Corporation; and W. W. Barger, inspector-chemist, treating plants dept., Atchison, Topeka & Santa Fe



Paul Wayman, vice-president, American Lumber & Treating Company, and R. R. Clegg, district sales manager, also American Lumber & Treating Co.

cap, replacing the butt-stringer design. At the framing plant, the caps are laid out in the yard on the same alinement as the track for which the timbers are being framed. The stringers are laid out on the caps, bored and marked according to plan, then pressure treated. All trestle bents are handled in a similar manner.

Laminated Grade Crossings

One of the uses to which treated timber is being put on the C. & O. is in the construction of railway-highway grade crossings on heavy traffic lines where "it is very difficult to maintain a smooth crossing due to vibration of the rails and slight pumping of the crossties." The road has overcome this problem to a large degree, said Mr. Nuckols, through the use of creosoted laminated timber crossing slabs which "are rather expensive on original installation, but are showing a maintenance saving over a period of years." He then described in some detail the construction of the laminated slabs, pointing out that they are treated with creosote with a retention of 8 lb. of preservative per cubic foot. These slabs are made in a standard thickness of 5¾ in. and are used with shims to adapt them to the various weights of rail. When one of these crossings is installed all track ties through the crossing are replaced with new treated sawed crossties, with the adzed side down for good surface. The laminated slabs are also used in the construction of station platforms, and in this event they are steam cleaned or treated with pentachlorophenol.

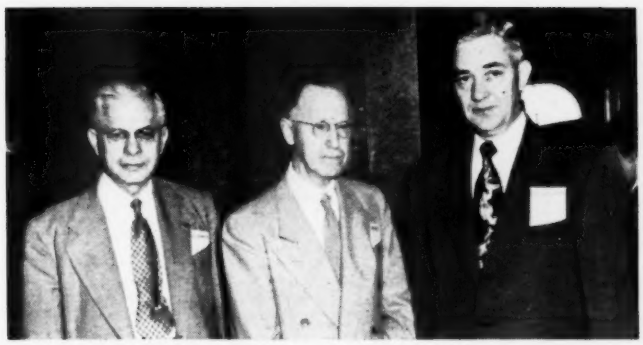
A test installation of treated fence posts was described by Mr. Nuckols, in which creosoted chestnut and pine posts gave the best results. As a result of these findings this road has used upwards of 30,000 creosoted pine posts during the past two years. "We are also using treated round pine braces 12 ft. long," he said, "in lieu of the untreated white oak brace, making all of our fence material, including gates, corner posts, line posts and braces, of treated stock for reasons of obvious economies and the availability of this fast growing species on line of road."

Mr. Nuckols noted that the C. & O. had used a considerable quantity of fire-retardent treated lumber and timber in roundhouse structures, retail coal trestles and bins, tunnels, freighthouses and warehouses. He also stated that since 1949 the road had been pressure treating, with a five-per cent solution of "penta" in petroleum, decking for station platforms and sign posts where a clean treatment is desired. "No doubt treatment with this type preservative or similar preservatives," he said, "will increase in the future to prolong the life of some building lumber."

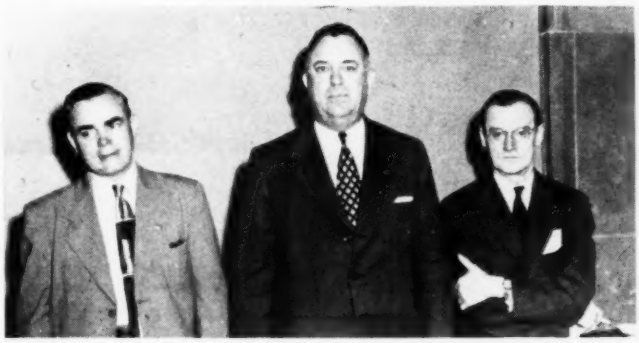
Committee Recommendations

Numerous recommendations involving standards and tentative standards of the association were made by the various committees. The Treatment Methods committees were particularly active in making recommendations. One of the recommendations made by Committee T-2, Pines, Southern, Jack, Ponderosa, Lodgepole and Norway, had to do with the recommendation adopted a year ago to the effect that the tentative standard for conditioning jack pine, red pine and lodgepole pine posts and

A. S. Daniels, Texas & New Orleans, and R. F. Drietzler, West Coast Wood Preserving Company. Mr. Daniels served as one of the session chairmen



L. E. Lockwood, Public Service Company of Northern Illinois; George M. Hunt, Forest Products Laboratory, retired; and R. H. Bescher, Wood Preserving Division, Koppers Company



R. J. Kepfer, E. I. du Pont de Nemours & Co.; Clarence S. Burt, assistant to vice-president, Illinois Central; and E. H. Reiman, also du Pont. Mr. Burt is chairman of Committee C-15, Railroad Car Lumber

H. L. Holderman, Chicago & North Western (retired); L. J. Deno, division engineer, Chicago & North Western; and H. L. Holstrom, Republic Creosoting Company

poles be amended to permit steaming for short periods under certain conditions. This year the committee recommended that the tentative revisions be confirmed as adopted standards. This recommendation was approved. Also approved was a similar recommendation relative to the standard covering the treatment of jack, lodgepole and red pine piles.

Among the recommendations of Committee T-3, Douglas Fir, Larch, Western Red Cedar and Western Hemlock, was one to the effect that the amendments to the standard for treating Pacific Coast Douglas Fir piles, which were adopted last year on a tentative basis, be confirmed and advanced to standard. A similar recommendation was made regarding a standard for the treatment of western larch piles. Both of these recommendations were approved.

Among the Preservatives Committees, Committee T-4, New Preservatives, acting on a decision of the Executive committee to the effect that trade names should not be used in any of the standards of association, recommended changing the names of five preservatives for which tentative standards were adopted last year. The recommendation here was to change Boliden Salt to chromated zinc arsenate, Celcure to acid copper chromate, Chemonite to ammoniacal copper arsenite, Copperized CZC to copperized chromated zinc chloride, and Greensalt to chromated copper arsenate. This recommendation was approved.

Some interesting information was presented in several of the reports of the Utilization and Service Records committees. For instance, Committee U-3, Service Records, presented tabulations giving the results of the Forest Products Laboratory inspection of the experimental test ties in the special test tracks of the Chicago, Milwaukee, St. Paul & Pacific at University avenue and near the Fair Grounds, Madison, Wis., and at Hartford, Wis. It made particular note of the fact that, of the 1701 ties installed at Hartford, 562, or approximately 33 per cent, are still in track after more than 40 years of service. Committee U-6, Pile Service Records, reported this year on an installation of marine piles near Corpus Christi, Tex. The installation is the Nueces Bay Causeway built by the state of Texas in 1921. "The excellent service rendered by these creosoted piles over a period of almost 30 years in marine borer infested waters makes this an outstanding record," said the Committee.

Election of Officers

In the election of officers R. H. Bescher, manager of technical department, Koppers Company, Orrville, Ohio, was advanced from first vice-president to president; P. D. Brentlinger, Forester, Pennsylvania, Philadelphia, Pa., was advanced from second vice-president to first vice-president; and I. C. Miller, vice-president, T. J. Moss Tie Company, St. Louis, Mo., was elected second vice-president. Newly elected members of the Executive Committee are R. F. Dreitzler, vice-president-manager, West Coast Wood Preserving Company, Seattle, Wash., and W. F. Dunn, Sr., tie and timber agent, Southern System, Washington, D. C. W. A. Penrose was re-elected secretary-treasurer. At the close of the convention it was voted to hold the next annual meeting at Cleveland, Ohio.

The two swing spans of the Illinois Central were kept open to permit unobstructed flow of the flood and passage of drift

High water hits I.C. near Council Bluffs . . .

Removing a sand-bag plug where the main levee crossed an industry track. A similar plug was thrown over the main tracks

The deposit of corn stalks and the complete scouring out of the ballast was typical of the flood damage to railway tracks

Thoroughly soaked by the flood, the ballast and embankment easily gave away to the backwash when the river water dropped

"Big Mo" Cuts Up...

Fast-Melting Snow Causes Record Flood

• Coping with floods is "old stuff" to the railroads, and those roads lying within the Missouri River watershed have learned most of the vagaries of that important stream and what must be done to minimize interruptions to their train operations. But every once in a while the "Big Mo" goes on a rampage, as in July 1951 when it joined up with the Kansas (Kaw) river, one of its tributaries, and raised havoc at Kansas City. This spring the river, running true to form, again pulled the stopper out of its bag of tricks to produce flood waters of greater proportions than the record established in 1881.

This year, however, the build-up for the flood was a long time brewing in the upper and middle portions of

. . . and North Western at various points

ABOVE—This view shows one of the more serious washouts on the Northwestern, which occurred near Crescent, Iowa. LEFT—A secondary levee (not needed) was constructed across these tracks as protection against failure of main levee

After the main track rails were moved back, a bulldozer rips up the roadbed to form a solid base for a secondary levee

More than 50,000 sand bags were piled around a spring house to prevent the forming of a sandboil at this weakened spot

the 530,000-acre watershed. Heavy snowfall in the upper reaches in Canada and in Montana and the two Dakotas, had built up gradually while the temperatures remained below freezing. Conditions were such that an ice layer was created at the ground line so that moisture could not seep into the soil. When a rapid spring thaw brought about by warm Gulf winds took place in the early days of April, the snow melted in one week and sent waters pouring down the streams tributary to the Missouri river.

On most of the tributaries and all down the Missouri river, floodwaters overflowed their banks and inundated farms, towns, highways, railroad tracks and yards. Among the principal railways serving this area, all of which suffered more or less extensive damage, are the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Milwaukee, St. Paul & Pacific, the Chicago, Rock Island & Pacific, the Great Northern, the Illinois Central, the Minneapolis & St. Louis, the Minneapolis, St. Paul & Sault Ste. Marie, the Northern Pacific, and the Union Pacific.

For the most part this flood followed the habitual pattern of washing out tracks and approach spans to the main river bridges, as well as causing slides in embankments. Some of the holes scoured out in the railroad em-

Union Pacific protects its Omaha yards . . .

One of the several centers where a large portion of the five million bags were filled with sand by thousands of volunteers

When sandboils break out behind the levee, they are like an enemy within the camp. Several rings finally contain this one

The railroad threw up an emergency levee to protect its shops and yard in the event that the weakened main levee should be breached by the flood. Here a tractor with a sheepsfoot roller compacts the soil as fast as the trucks haul and dump it

bankments in the inundated territory were 10 ft. deep and several hundred feet long. In one instance, the floodwaters took out 430 ft. of railway embankment to a maximum depth of 64 ft. below the base of rail. In many instances the major damage to railroad property occurred when the floodwater receded rapidly causing serious washing of tracks and embankments which previously had simply been inundated.

Some of the more important points where railroads experienced serious flood damage were Havre, Mont., Bismarck, N. D., Pierre, S. D., Mobridge, S. D., Chamberlain, S. D., Sioux City, Iowa, and South Sioux City, Neb. Long stretches of track damage occurred between Council Bluffs and Kansas City, Mo. Also, flood damage was experienced on tributary streams that are normally docile and under control, such as the James river which hit Sioux Falls, S. D., very hard. The Missouri river and its tributaries were not the only ones to create problems for the railroads, because the Mississippi river also had the same snow and ice conditions in its upper reaches. It was necessary in at least one instance for freight trains to be detoured around the Twin Cities.

Probably the most dramatic episode in this 1952 flood was the successful fight that was waged at Council Bluffs and Omaha where a crest of 28.5 ft. in the Missouri had been predicted by the U. S. Weather Bureau. Since the levees through these cities were designed to protect them from a flood crest of 26.2 immediate steps were taken to increase the height. But on April 11 the Weather Bureau revised its prediction to 31.5 ft.

Contractors, bringing their earthmoving equipment and operators, quickly responded from miles around to a telephone request by the U. S. Army Corps of Engineers and were promptly set to work in borrowing material from nearby hills and placing it on the levees. Army engineers came from down-river points to assist in the fight and many townspeople volunteered for the work. Here, as well as elsewhere, railroad forces were in the thick of the fight. Traffic was stopped on the railroad lines and yards where they passed through the main levees and the holes were plugged to produce levee continuity. In some instances, secondary dikes were thrown up across the railroad yards and tracks in the event of a failure of the main levees. Flashboards, backed by sand bags, were erected on the main levees. As a result of all this coordinated effort, the two cities were saved even though the floodwaters reached a crest of 30.24 ft., an all-time high.

The control center was located in the office of the road's chief engineer. Here two operators confer before dispatching emergency crews and materials

An advantageous look-out point for a man with a "Handie-Talkie" was on top of the U.P.'s bridge

Walkie-Talkies Aid Omaha Flood Fighters

• Two-way radio communication, with the control room or "nerve center" located in a railroad office, played an important role in a gallant 10-day fight that was waged at Omaha, Neb., and Council Bluffs, Iowa, to save these cities from inundation by the floodwaters of the berserk Missouri river. This fight meant funneling the floodwaters, which above the cities extended 14 miles wide from bluff to bluff, through a channel about 1,200 ft. wide between levees. By limiting the water to such a narrow passageway, the level of the water was bound to rise and the pace quickened, placing a severe strain on the levees.

Although about 2,500 workers were engaged in this fight, many tight situations arose making redisposition of these forces necessary. Such emergencies call for quick action, and this in turn is dependent upon instantaneous communication. Radio equipment was furnished by the Union Pacific for the original radio network. This was augmented by 20 Motorola "Handie-Talkies" purchased by the City of Omaha. To fill this order, the Motorola Company ground crystals for 18 straight hours to match the U. P. equipment. These portable two-way radios were assigned to patrolmen covering the levees on both sides of the river and hence were in constant contact with three remote units—one in the city hall, another in the office of W. C. Perkins, chief engineer of the U. P., and the third in a mobile U. P. repair shop. These remote units all operated through the U. P. central station and antenna atop the U. P. building.

Other portable radio units were brought into the fight, including 20 which were loaned by the Omaha Fire Department, 27 additional Handie-Talkies furnished by the Army, 250 mobile units provided by the Northern Natural Gas Company, and the radio-equipped taxi-cabs of four companies. The frequency used was 160.29 megacycles.

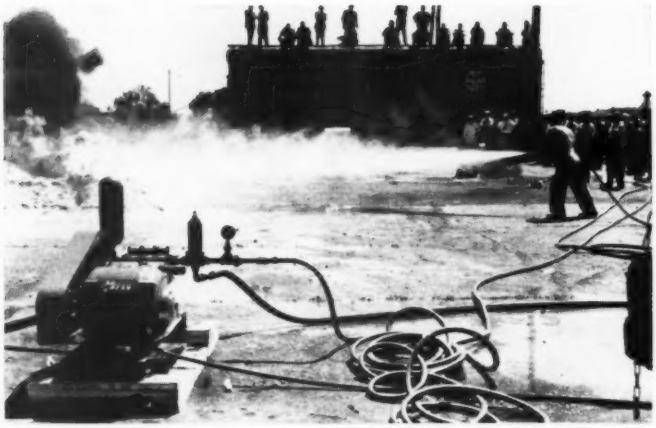
Men, sand bags and machines could be dispatched promptly whenever a weak spot developed in the levee. Food and coffee could be directed to hungry workers on other levees and to those reporting on the rise and fall of the water level.

This member of the Corps of Engineers kept distant points informed of activities while men worked around the clock

One of the incidents in which these radios helped to expedite men and materials came when the flood was at its crest. At this time it was reported that the Grace Street sewer had burst three blocks behind the levees and was pouring water into the busy industrial district. While driving in his car to the site, the assistant chairman of the flood committee ordered 40 steel I-beams to be delivered to the levee point where the sewer emptied.

Men had been dropping sand bags in front of the sewer outlet but without success. In the meanwhile, the steel beams were delivered to a barge which brought them to the sewer outlet. A grillwork of beams was constructed over the opening, then large boulders were dropped in front of them, cutting the flow to a trickle so that sand bags could be dropped to fill the chinks. Constant radio communication directed the night-long struggle.

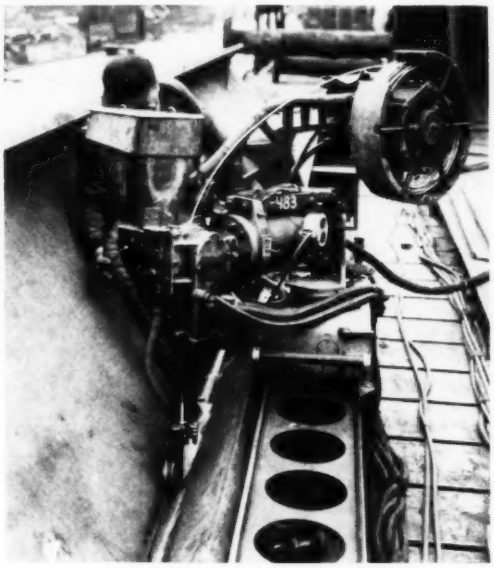
The flood emergency proved that this two-way radio equipment could be combined to make an extremely efficient and important tool in any kind of a civic emergency. In less than a week's time a smoothly functioning system of radio control and coordination had been established.

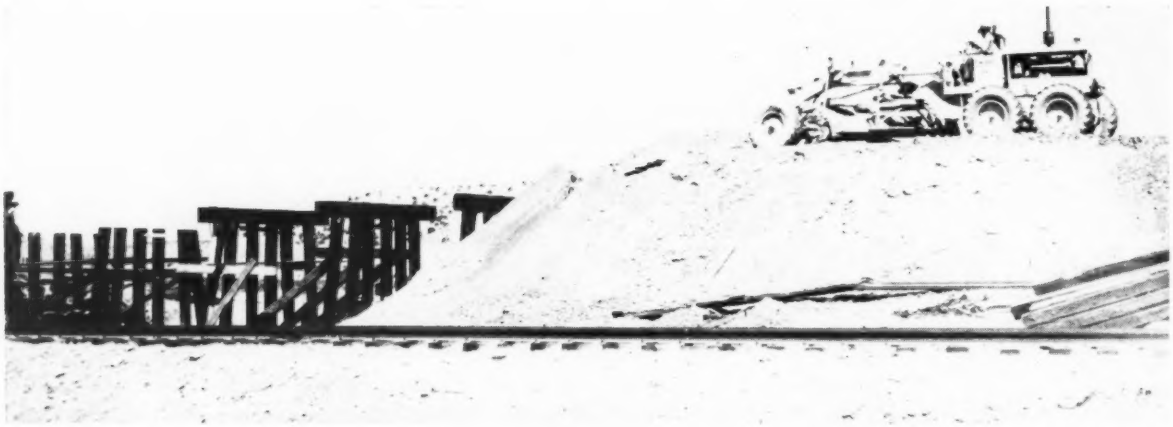


ABOVE—A curtain of fog to extinguish an oil pit fire was produced by the John Bean high-pressure pumping unit in the foreground during a recent fire-fighting demonstration on the Southern at Jacksonville, Fla.

News Briefs in Pictures . . .

BELOW—This Unionmelt welding machine on a track-mounted portable carriage is employed by the Maryland Drydock Co., Baltimore, Md., to fabricate 27 I-beams for the Pennsylvania's Mulberry St. bridge at Baltimore. The special beams are over 62 ft. in length and weigh almost 9 tons each. Sections are held in a special jig during the welding operation



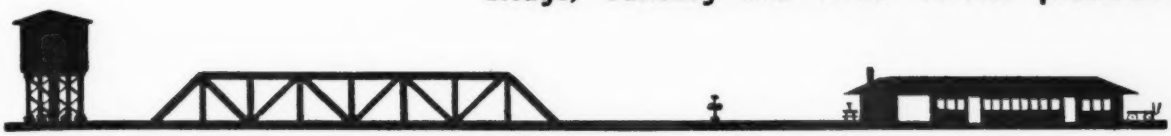


ABOVE—On the Santa Fe main-line right-of-way north of Bernalillo, N. M., this Caterpillar Diesel No. 12 Motor Grader is being put to use in raising the grade to improve both drainage and alignment

LEFT—At a recent demonstration held in the Latonia yards of the Louisville & Nashville at Covington, Ky., the Athey Hiloader Track Cleaner performed under the watchful eyes of representatives of the New York Central, Nickel Plate, and Chesapeake & Ohio, as well as the L. & N. The machine is shown here as it loads into a hopper car 11 ft. in height. The Hiloader possesses the ability to discharge material at a height of 15 ft. 7 in.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Use of Wood as a Steel Substitute

In view of the current steel shortage, to what extent can wood be used as a substitute in the construction of railway buildings? Explain.

Wood Use Well Established

By James J. Healy
Supervisor Bridges & Buildings,
Boston & Maine, Boston, Mass.

In view of the current shortage and strict allocation of steel, it is necessary for railroads and private industry to look for substitutes in the construction of buildings. Railroads face no serious problem as the use of wood for many types of buildings has been an established practice in the interest of economy for many years.

The wood-preserving industry has developed and improved the pressure treatment of wood to such an extent that the life of a structure constructed of wood is increased and maintenance reduced. Some preservative treatments not only provide protection against termites and decay but also incorporate protection against fire without altering the structural strength of the wood.

The structural engineers and architects who are charged with the responsibility of designing railroad buildings from the simplest roadway structure, such as a section headquarters, to a passenger station or diesel-repair shop, will find that wood of proper selection can be utilized from the foundation to the roof.

The former difficulty of obtaining heavy-section wood beams for roof trusses has been overcome by the design of laminated truss members permitting the use of smaller dimension timber which is obtainable in all parts of the country.

The interior finish of buildings may be designed with a view to using plywood or any of the several by-products of wood which are manufactured in sheets of varying thickness.

Glass blocks, asbestos products, wood panels, clapboards, or novelty siding may be used for the exterior finish of railroad buildings and the many products now on the market afford the designing engineer or architect a wide choice for a pleasing and utilitarian design using one or more of these materials.

Use of Wood an Old Story

R. C. Henderson
Master Carpenter (Retired), Baltimore & Ohio, Dayton, Ohio

To some of us old timers this question might seem rather strange. The strangeness is due to very little steel being available, at least for use in the erection of the ordinary railway buildings, at the time we first started work on the railroad and for several years thereafter. In other words, we might say that the use of steel to the extent now known has come about during the past quarter century. As I remember about all the steel that was used previous to this was in gutters, flashing, roofs, reinforcing, etc. This being true we might substitute steel construction with wood construction by using the standards for railway structures in effect during these early years.

It seems only yesterday that we started the erection of steel buildings in place of wood structures and there should be no difficulty, at the present time, in substituting wood structures, including prefabricated buildings, for them. While the question does not in any way refer

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the September Issue

1. What are the essential characteristics of a satisfactory flangeway for bituminous grade crossings? What type of flangeway gives the best results? Explain.

2. What types of floor surfacing materials are most suitable for use with radiant heating systems? Why? How should the flooring be applied to produce the most effective results? Explain.

3. To what extent, if any, is grouting of fills effective in preventing washouts during floods? Explain. Should the grouting methods used for this purpose differ from normal procedures? If so, how?

4. What methods of fastening timber decks to steel overhead highway bridges are most effective in keeping plank or floor strips tight under traffic? Explain.

5. On main lines, what are the advantages and disadvantages of increasing the number of ties per 39-ft. track panel from 22 to 24? Explain.

6. What factors generally determine the size of chemical vats in water treating plants? What advantages, if any, might accrue from the installation of larger vats? Explain.

to concrete structures, it is true that a large number of such buildings have been erected, substituting for both wood and steel. This is especially true in the smaller types of building, such as telephone booths, watch shanties, relay houses or various yard and shop buildings.

The substituting of wood for steel in the large buildings can be very effective when taken into consideration at the time the plans are made. It will mean the use of sash and doors of all kinds and sizes, wood lath or plasterboard, solid or laminated timber trusses, beams, and sills. This substitution would cover most railway buildings up to the larger multiple-story structures that are now being constructed with combinations of steel, concrete and brick. It is doubtful that it would be good policy to substitute wood for steel in such structures, and unless the need is great, its erection might best be postponed until steel is again in good supply.

In conclusion, I think the substitution of wood for steel will depend a great deal on the size, type and intended use of the building. In the erection of one-story structures of nearly all types, the use of steel might be eliminated entirely by the use of wood and concrete. On large structures the use of steel might be reduced by the use of wood sash and doors of all kinds and sizes as previously mentioned.

It should, of course, be understood that in all substitutions, the wood should be given treatment suitable for the use to which it is to be put so that we can expect it to have a life comparable to steel.

Now a Practical Substitute

By R. D. Behm

Chief, Plywood & Fabricated Products Branch, Lumber and Wood Products Division, National Production Authority, Department of Commerce, Washington, D.C.

The lumber industry has made tremendous strides in developing structural trusses and laminated wood beams that are now competitive and practical alternates for steel. Three optional methods are available: (1) Use bowstring truss and timber-connector construction by slight modification of design; (2) use laminated beams made with new waterproof, heatproof adhesives (generally such beams can be interchangeable with steel I-beams without redesign, and spans of 60 ft., 80 ft. or up to 100 ft. are commonly used); and (3) use built-up box girders of plywood and lumber (new membrane tests have recently been completed).

Leaders of the lumber industry attending a recent National Production Authority meeting stated that laminated beams offer greater protection from fires than steel beams. They pointed out that high temperatures soften steel and often cause a structure to collapse while a wood beam will char and even under one-hour tests will retain its strength factors. Furthermore, firemen will fight fires inside warehouses of timber construction but will not enter steel structures but only confine their fighting to the exterior.

No formal records are available of the volume of fabricated wood timbers. However, it is estimated that over 100 million square feet of lumber is now being fabricated annually by established wood-engineering firms. Many millions of feet of lumber are also built into trusses at on-the-site locations. Unless military demand accelerates materially, the planned expansion should be adequate to fabricate essential civilian needs.

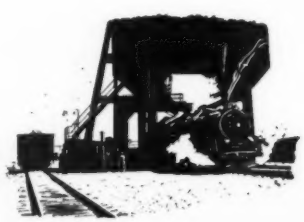
A number of railroad companies have already used laminated wood trusses and beams. This fact was brought out at an Industry Advisory Committee meeting held by the N.P.A. Such construction is common along the West Coast, but reports have come to us of the use of such members in certain areas in Pennsylvania.

Alternate Not Always Needed

By John R. Hursh

Manager, Railroad Sales, Eastern Division, Armco Drainage & Metal Products, Inc.

The problem of substituting wood for steel in the construction of railway buildings poses two questions: (1) Is the substitution necessary? and (2) is the substitution desirable? While it would not be possible, within the confines of this discussion, to discuss fully the pros and cons of the alleged steel shortage, a few brief observations may be in order.



In the first place, the steel industry generally has been unable for some time to find evidence of the acute shortage of steel which is alleged to exist. No one can deny that there have been instances of extreme shortage and hardship, but by and large these cases have been confined to specific products or types of steel and in no way represent the steel supply situation *in toto*. At the present time, even those shortages which have existed are being rapidly alleviated, as evidenced by increasing allotments from N.P.A. for many lines of business using steel. This is particularly true in respect to sheet steel, in which demand appears to be rapidly nearing supply. It is with sheet steel that we are particularly concerned, as this is the basic material for the average small- to medium-sized railway building.

As for the desirability of substituting wood for steel in these railway buildings, it seems to me that extreme caution is called for lest the end result of such substitution be so disadvantageous as to be out of proportion to the advantage accruing from saving the small amount of steel required. Steel buildings offer many advantages, among which may be listed fire resistance, portability, ease of erection, low cost and durability. Furthermore, the conditions which have led many major railroads to make the change from wood construction to steel have not and will not change simply because of some temporary dislocations in the steel supply. It would seem poor economy indeed to lose the many advantages that modern steel building construction offers when actually there is ample steel available for this purpose.

Admittedly, there may be instances in which a specific building, because of its peculiar characteristics or uses, may require steel of a type which is not readily available. Rather than to be governed by generalizations, it seems that a much simpler method would be simply to inquire of any one of several steel suppliers who specialize in steel buildings adapted for railway use as to the availability of material for any specific building as the need arises. Steel suppliers are most well informed of the conditions of steel supply at any given moment, and their advice should be relied on in arriving at a decision as to the type of material to be used.

What About Steel Specification A-7?

In the light of recent experience what are the weaknesses, if any, of steel made in conformity to specification A-7 of the American Society for Testing Materials? To what extent might these weaknesses affect the use of this steel in railway bridges? Explain.

Generally Satisfactory

By E. J. Ruble

Structural Engineer, Engineering division, Association of American Railroads, Central Research Laboratory, Chicago

The question regarding the suitability for railroad bridges of steel made in conformity to A.S.T.M. Specification A-7 would certainly be easier to answer if it dealt with the favorable points of the steel. It is generally considered by railroad bridge engineers that this steel meets the majority of the present-day requirements for the fabrication and erection of railroad bridges. It is very satisfactory for riveted construction, but may be said to have one weakness for welded construction. For that method of fabrication the carbon content of the killed steel is somewhat high, especially in the thicker plates, while the porosity of the rimmed steel prevents its use for welding. However, this is not considered serious by most railroad bridge engineers since most of the welding done on their bridges is for maintenance or strengthening. Some criticism has also recently been expressed to the effect that the sheared edges of plates are susceptible to brittle fracture, especially at low temperatures, and this matter is now being studied by the members of the A.R.E.A. Committee on Iron and Steel Structures.

It is well known, of course, that any steel structure is subject to stress raisers, and a progressive fracture or fatigue failure will result under repeated cycles of load. The effects on the fatigue strength of the various types of stress raisers and the various kinds of structural steels, such as those found in the usual fabricated bridges, are being studied by the Research Council on Riveted and Bolted Structural Joints. In general, it has been found that the fatigue strength of A-7 steel in fabricated joints is well above that recommended by the present design specifications.

Considerable discussion has ensued in various committees within recent years about the A.S.T.M. Specifications covering the manufacture of A-7 steel. The principal discussion by the consumers has centered on the article covering "Defects." This article permits the manufacturer to remove surface imperfections in the plates and rolled shapes by grinding or chipping and then depositing thoroughly fused weld metal on the surfaces and edges of the area. The weld metal is required to project above the rolled surface and the projecting metal is then removed by grinding or chipping and grinding. The principal objection to this article in the specifications is not in the manner of conditioning the steel, as most engineers realize that the static and fatigue strength of the welded section is about the same as that for the full section, but most bridge engineers would prefer that this conditioning be done in the fabricating shop where closer inspection can be maintained. Most bridge engineers would be satisfied to have the chipping and grinding done in the mills but would prefer to have the welding of the ground and chipped areas done in the fabricating shop since it might then be possible, in certain cases, to locate the conditioned section away from the point of high stress.

Other objections to the specifications have been raised by some bridge engineers regarding the article on "Permissible Variation in Dimensions or Weight," in which tolerances have been considered excessive, particularly regarding such items as camber, off-center rolling and flange tilting.

Too Much Carbon for Welding

By Assistant Engineer

Steel for bridges and buildings in this country is being made in conformity to tentative specifications of the American Society of Testing Materials, A-7-50 T, replacing A-7-36, Steel for Bridges, and A-9-36, Steel for Buildings. The latter specification was adopted in 1901, revised at different times until combined with A-7 in 1931. The specification covers carbon steel shapes, plates, and bars of structural quality for use in construction of bridges and buildings and for general structural purposes. Recent experiences in welded structures have provoked serious statements that the increased carbon content permitted by these specifications is responsible for some weaknesses or failures that have occurred in such structures

The carbon content of the steel is regulated according to the use for which the steel is designed, that is the strength and quality. For example, in the specification a paragraph on Bearing Plates for Buildings states, among other requirements, that plates over 1½ in. thick used as bearing plates in buildings, unless otherwise specified, shall be open-hearth or electric-furnace steel containing from 0.20 per cent to 0.33 per cent carbon. The increase in carbon content has increased the yield point of the steel but not without depreciating effects.

In the winter of 1951 the Duplessis highway bridge in Quebec collapsed. Although the causes of the collapse have not been fully explained as yet, opinions have been advanced that a plausible explanation may be found in brittle cracks in welded areas. A peculiarity of the brittle cracking is that it occurs in cold weather without the familiar plastic deformation before and during collapse. To most practical bridge men, this means without the imposition of the designed live loading. This phenomenon had been observed in other structures that collapsed during periods of low temperatures. The writer is not familiar with any all-welded bridges carrying railroad traffic. It is the common and accepted practice to repair weakened members of steel bridges and to increase the capacity of some bridges using various welding techniques. It is in the use of steels made according to the A-7 specification for such work that railway bridges may be affected.

Intricate laws govern the stresses that cause plastic deformation and brittle fractures. Only a few words of general explanation will be attempted here. In welding processes, particularly if thick plates are being joined together, shrinkage in all directions is impeded and high multiaxial stresses develop. It has been found that brittle cracks occur under some degree of loading when residual shrinkage stresses are present in the steel members. It is known, also, that under increasing tensile load this brittle strength may be reached before the tension yield stress is reached, consequently the brittle fracture occurs before the steel deforms. Low temperatures enhance fracturing.

Tests have shown that steel that is free from residual stresses will remain ductile under practically any service temperature. Steel of similar composition with high shrinkage stresses will, under low service temperatures, fracture in a brittle manner without the possibility of high localized strains being neutralized by plastic deformation. The metallurgical properties of steel play a highly important part in welded structures in order to maximize ductility.

Designers of welded structures in Europe have been cognizant of this problem for some time. There, plate thicknesses of more than ⅝ in., or 1 in., are avoided and killed steel is used exclusively. Carbon content is limited to 0.15 per cent. When plate thicknesses of more than one inch are required, the structure is normalized by heating to reduce residual stresses after welding. In this country standard specifications of the American Welding Society mention that, where metals up to 2½ in. are required, material above 1 in. in thickness must be preheated and have a limited carbon content. The American Waterworks Association design specifications for welded water tanks state that any material exceeding 1½ in. in thickness be preheated. The specifications do not limit plate thickness. On one large penstock job, 2 3/16-in. plates were successfully field welded with an induction method used for preheating.

Very recently on the west coast an all-welded girder span for a highway bridge was made the subject of a full-scale test to determine the adequacy of specifications covering material and welding procedures for heavy all-welded structures. It is proposed to construct a viaduct of considerable length of similar construction. Each girder of the test span had a length of 106 ft. The web was ⅜ in. by 4 ft. 6 in.; the bottom flange, 3 in. by 20 in.; and the top flange, 3 in. by 16 in. Shear lugs were used on the top flange. The flanges were welded to the web with a continuous ½-in. weld using automatic welding equipment. The steel was preheated using a 300-deg. F. heat adjacent to the weld. A careful sequence of heating and welding produced excellent results. The steel was limited to a carbon content of 0.29 per cent and had a yield point of 27,500 p.s.i. Further tests will be conducted to determine if less preheat can be used and the same strength obtained with less carbon content.

Chemical Stabilization of Soil

What new methods involving the use of chemicals have been developed for stabilizing soils. What are the possibilities of their use on the railways? Explain.

Okay for Some Uses Now

By T. William Lambe
Director, Soil Stabilization Laboratory, Massachusetts Institute of Technology, Cambridge, Mass.

The need for chemical means of altering or controlling soil properties can hardly be questioned. The dwindling supplies of selected materials such as gravel and the developing of a civilization which demands that structures be built at sites which in the past would have been avoided combine to make it necessary to work with many types of soils. The soils engineer is coming under increasing pressure to alter the properties of an existing soil to meet definite specifications. The ever-increasing need to control soil properties, along with the availability of new chemicals, has caused the intensification of research into soil stabilization. Among the places where soil stabilization research is being conducted are Cornell university, under the direction of Professor B. K. Hough, Jr.; Purdue university, under the direction of Professor K. B. Woods; Princeton university, under the direction of Dr. Hans Winterkorn; Tropical Agricultural Research Laboratory, under the direction of Dr. George Rappleyea of the Monsanto Chemical Company; and M.I.T.

Before considering the new soil stabilizers, I would like to point out the three general requirements for a successful stabilizer. To be adequate, it must: (1) Control soil properties; (2) be incorporable; and (3) be economical.

It is of course obvious that the successful stabilizer must adequately do the job for which it was selected. It is not so obvious that a desirable stabilizer must be a substance that lends itself to incorporation with soil. Current research is emphasizing the difficulty of satisfactorily mixing additives with cohesive soils, those which are in most need of stabilization. It is interesting to note that the ideal characteristics of a stabilizer in place are usually opposite to those required for ease of incorporation with soil. This difference in characteristics suggests a stabilizer which undergoes a reaction in the soil to alter radically its properties. For any stabilizer to receive commercial application, its use must of course be economically justified.

Of the present methods of stabilization which are being investigated, the two which are most promising are: (1) Those which employ a physicochemical reaction; and (2) those which employ *in situ* polymerization. The use of aggregating or dispersing substances which react only with the surface of the soil offer the very desirable feature of requiring only small amounts to be effective. For example, additives have been found which are extremely effective in treatments as small as 0.01 per cent of the soil weight.

An example of a material whose action is limited to the surface of the particles is furnished by partially hydrolyzed acrylonitrile, marketed as Krilium by the Monsanto Chemical Company. In the presence of water, Krilium is very effective as a soil aggregator. On the other hand, materials such as the polyphosphates can be excellent soil dispersers. *In situ* polymerizations have been shown to have great promise. Characteristics which are desirable for mixing can be obtained with a monomer and characteristics which are desirable for stabilization can be obtained from the polymer.

The addition of calcium acrylate monomer, along with a redox catalyst system (for example, ammonium persulfate and sodium thiosulfate), to a soil, followed by polymerization, has been found to have marked effects on the engineering properties of the soil. The calcium acrylate polymerization will give to soils what no common stabilizer will—namely, tensile strength and flexibility. The low viscosity of the monomeric solutions is very desirable for injection. Detailed information on these new stabilizers is available in literature.

The two major problems to be overcome in the use of chemical stabilizers are incorporation and

economics. The incorporation of additives with clays has always been a major problem. Current research shows that present commercial equipment mixes Portland cement and clay at an efficiency as low as 30 per cent. Although some of the new chemical additives are more easily incorporated than cement, the process of mixing is still a major problem to be overcome. The cost of the new chemical stabilizers is high in comparison to one and two cents a pound for cement and asphalt. Their use will initially be limited, therefore, to special problems where the high cost is justified by the unusual properties that can be obtained. The present unfavorable economic picture will gradually change as the cost of the chemicals comes down and the treatments are perfected through further research.

I feel that soil stabilization with chemicals is a subject in which railroads should be vitally interested. A few of the places where railroads might use soil-chemicals are: (1) Construction of fills; (2) slope stabilization; (3) erosion control; (4) strengthening of weak subgrades; (5) control of frost action; (6) in the construction of terminal facilities.

In summary, I feel that the use of chemicals to alter and control properties of soil has tremendous possibilities. Considerable progress has recently been made, and more is promised by the present intensive research underway. Although the present economic situation is unfavorable for extensive use of chemicals in railroad work, the use of chemicals for certain applications—for example, injection into subgrades and for erosion control—appears to warrant investigation by the railroads at the present time.

Chemicals Solidify Soils

By C. Martin Riedel
Chemical Soil Solidification Company, Chicago

Chemical soil solidification to stop the settlement of foundations, to stop the damaging flow of ground water, to protect existing foundations against sliding during excavation work nearby, to consolidate quicksand-like areas (floating track!) under roadbeds of heavy-traffic lines, to seal leaky joints in tunnels, shafts, concrete reservoirs, etc., has been in practical use in this country since about 1941. Two chemicals are used. Silicate of soda (water glass), called chemical 1, is injected first through suitably spaced 1¾-in. injection pipes which have special perforated points.

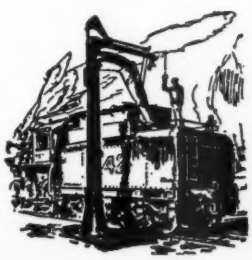
After proper saturation of the area required, a strong calcium chloride solution, called chemical 2, is pumped in without delay. As both solutions meet in the porous sand, wet or dry, a silicic gel is formed which hardens quickly, binding together the loose natural material to a solid, load-bearing, highly dense mass, which gains in hardness as time goes on. Acid in ground water or sea water does not affect the hardened material. The practical depth reached to date is about 80 ft. Duplex pumps are used for injection.

There are several special solutions of silicate of soda used for different types of sandy soils. Chemical 2 can also be modified for varying geological conditions. The application must be prepared and carried out by specially trained engineers and key men to prevent failures or unsatisfactory results. In addition to the air-driven pumps, injection pipes, drive heads, and special injector-valve heads (to be patented), special motor-driven hydraulically operated jacks have been developed for pulling the pipes while the chemicals are given in carefully measured quantities.

This method, briefly described above, is based on the Joosten system, developed by a Dutch mining engineer for underground work. It has been gradually developed and improved after more than 20 noteworthy jobs were carried out in this country. It is not a competitor to concrete, but an auxiliary in heavy foundation work and maintenance operations. Whereas concrete as poured in foundations will support a load of 3000 p.s.i., solidified sand or sandy soil will carry from 300 to about 950 p.s.i.

The cost for solidifying soil depends on various factors: (1) Depth of injections; (2) accessibility; (3) character of natural layers; and (4) obstructions in the ground if not known before starting. However, the unit cost of one cubic yard solidified compares well with that of good concrete in place.

This process has one limitation, in that it is not recommended for natural strata containing more than 25 per cent of clay or silt or material of fineness exceeding 125-mesh size.



New Chemical Shows Promise

By Larry Schulenburg
Advertising and Public Relations, Monsanto Chemical Company, St. Louis, Mo.

As a result of original research we have developed a synthetic chemical soil conditioner of the polyelectrolyte type which we feel will achieve effective and economical control of rain erosion. This product is expected to have wide application in controlling slope erosion problems created by major earth-moving construction projects, including railroad construction.

The new soil conditioner is easily applied when used for erosion control by either of two ways. It can either be mixed with grass seed and fertilizer and applied to slopes and freshly graded areas from mobile equipment in a single operation by means of a water spray, or the mixture can be dusted simultaneously on the surface by ordinary mechanical spreaders at the rate of approximately one pound of chemical for every 100 sq. ft. to be treated.

After this soil conditioner becomes wet, it forms a water-permeable plastic film on the surface of the ground during the period necessary for establishment of a permanent cover crop in erosion control. In addition to providing marked resistance to the erosive action of water, including splash erosion by raindrops, the product improves conditions for seed germination and subsequent growth of the grass or vegetative cover always necessary for permanent protection against erosion. Unlike previous film-type treatments such as asphalt or resin emulsions, surface treatment with our soil stabilizer increases water penetration and reduces run-off and at the same time holds seed and soil in places while grasses or legumes are germinating and becoming established.

Extensive field tests concerning the product's effectiveness, advantages and methods of application for erosion control are continuing. The evaluated results of this practical work in railway maintenance will speak for themselves.

Effect of Checks on Usefulness of Ties

In what ways do checks affect the usefulness of ties? How does the size or type of check influence such usefulness? What determines those which are harmful and those which are not?

Checking Limits Tie Life

By T. H. Patrick
Timber Treating Inspector, Chicago, Milwaukee, St. Paul & Pacific, Chicago

One of the more important things to guard against in the rise of ties is checking and splitting during seasoning periods and while in track. Checks develop into splits, and splitting is now one of the main reasons for removing ties from track.

Checking affects the strength of ties and extreme checking influences their usefulness for the purpose intended. Heavy checking of ties in track is the first mark of deterioration. Large checks tend to grow and finally result in splitting the tie. This growth develops from the strain on the tie, springing the tie wider. Pebbles falling into and working deeper and deeper into a check as trains pass over the track, along with ice conditions and rapid changes in moisture content, finally split the tie and destroy its usefulness. Checking after treatment exposes untreated wood to fungus attacks and results in destruction of the tie by decay.

As to size of checks to guard against, there appears to be no set rule. In general, checks large enough to admit small stones from the ballast to enter, and ones with openings 1 in. deep or more, should be avoided in taking ties. It is better to have many small checks than one large one. Incising of ties is being advocated because it causes numerous small, hairline checks and eliminates most of the larger, more serious, checks. Such small checks fill with preserving oils and so are not particularly harmful to overall tie life.

We have found no way of preventing checking in ties, but, by properly stacking them for seasoning to prevent too-rapid drying, the number of larger checks can be reduced. The application of anti-splitting devices, such as irons, dowels, and bolts, is beneficial during the seasoning period in keeping down end splitting. During tie service in track, bituminous coatings, dowels, bolts, and similar devices, are helpful in reducing the splitting of ties. Bituminous coatings give good promise of eliminating one of the causes of checking by preventing rapid changes in the moisture content of the wood. Good ballast that allows quick drainage of water away from the ties, before the moisture content of the wood is materially increased, is also very helpful.

We have learned many ways of reducing checking, but not to eliminate it entirely. Until some one finds a way to dry the surface and inner wood uniformly at the same time, we will have to live with checking and learn to reduce it as much as possible.

How to Keep Sand from Fouling Ballast

In mountain territories where it is necessary for equipment to sand rails, what methods are most effective in minimizing the fouling of the ballast by the sand? Explain.

Make Enginemen Sand Less

By General Track Supervisor

In mountain territories where it is necessary for locomotives to use sand in order to have traction and to keep the engines from slipping, the fouling of ballast is a real problem. Proper education of the locomotive engineer who is responsible for the operation of the sanders has probably done more to reduce the problem than any one thing. Constant attention must be given by responsible supervisors to see that the instructions are followed by the engineers. It is not necessary in most instances for the engineer to have the sanders in full operation at all times. In fact, we all agree that a little sand at the proper time is essential, but due either to carelessness, to lack of understanding, or to indifference on the part of the individual engineers, excessive amounts of sand are all too frequently used.

A smaller type ballast such as cinders or small rock is helpful towards maintaining the track where sanding conditions are excessive—the smaller the type of ballast used, the longer it takes for it to become fouled. The problem of removing excessive engine sand is made much simpler by making a well defined hole in the tie crib under the base of rail. Sand can be cleaned from this hole by an ordinary track shovel.

The removal of the ballast from the ends of the ties to permit drainage, particularly on the low sides of curves, is very helpful where sand is continually fouling the ballast. Outside factors which might do much toward minimizing this problem include a sanding valve which could be automatically operated by the slippage of the drivers, and improvements made in our present sanders.

Run Dirt Sweepers

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

The use of diesel locomotives has cut out much sanding of rails and has largely eliminated front-end cinders which used to mix with the sand and foul the ballast. However, there are still some railroads on which sand, and even cinders, foul the roadbed.

In territories where such fouling of ballast is bad, it is the practice to clean the ballast on the shoulders and between the tracks with off-track or on-track ballast-cleaning equipment and, where conditions allow, to follow the cleaning with a light raise on fresh ballast, thus getting the ties out of the mud and restoring the ballast section.

Where cleaning the ballast is not economical, it is the practice to dig out foul ballast and dispose of it and to use new ballast to restore

(*Continued on page* 592)

the ballast section. This method also consumes much time and money.

With less sand and cinders to contend with and with higher costs of labor, ballast and services entering the picture, it is now essential that ballast be kept from becoming fouled up with sand, even in the few territories where that is happening.

The best way to do this is to seal off the top of the ballast with a light blanket of tar or liquid asphalt to keep sand, cinders or dust from entering the ballast section and then periodically to run a sweeper having a dirt collecting attachment over the places that need it. This procedure might be economically applied to approaches to interlocking plants, switching leads and to some locations situated in mountain territories.

Fuel-Oil Filtration and Dehydration

In handling diesel fuel oil, what are the relative merits of combined water removal and filtration equipment as compared with pressure-type renewable cartridge filters?

Must Have Separate Filters

By A. B. Pierce
Engineer Water Supply, Southern Washington, D. C.

The primary function in furnishing satisfactory diesel fuel oil is the proper installation, operation and maintenance of pressure-type renewable cartridge filters, and our second consideration, if necessary, is the removal of water content in diesel fuel.

Dehydrators are used primarily for water removal, and the filter added to them uses elements too small and of a medium that would give only partial filtration, and cannot be compared to special pressure-type element filters manufactured for the sole purpose of furnishing fuel oil practically free from all foreign matter.

We install cartridge-type filters, which are used for the sole purpose of filtering oil unloaded from tank cars or trucks and pumped to storage tanks. In addition we install a separate battery of filters at the service platform for the sole purpose of filtering oil as it is delivered direct to the diesel locomotives. Based on the amount of oil handled, instructions are given for a definite time to renew the filter elements. From our experience we would not desire to combine our filtering arrangements with water-removal equipment. It is felt that the type of men operating our filters should not be burdened with the proper operation of combined filter and water-removal equipment. If it is deemed necessary to install water-removal equipment we would recommend that it be separate and apart from filters installed to remove all foreign matter.

From our analysis of diesel fuel oil taken from servicing nozzles we have not deemed it necessary, at least at this time, to install water-removal equipment. At the bottom of all of our vertical storage tanks we have installed a sump for the collection of water or condensation in the tank. Special siphon piping arrangements are installed from the sump through the side of the tank to remove any accumulation of water. This arrangement is also used to take samples of fuel oil for analysis to determine water content.

The above is not to infer that combination dehydrator and filter equipment would not function properly, but we feel that it would require high-class labor, special handling and careful maintenance for this type of equipment satisfactorily to take care of the dual function of removing foreign matter and water from diesel fuel oil.

Dehydrators Are "Insurance"

By O. G. Mahnensmith
Manager, Railroad Sales Division, Bowser, Inc., Fort Wayne, Ind.

Water is classified as being the "Number-One Bandit" in locomotive fueling. Therefore it is a definite advantage to have clean, "dry" fuel. Filtration has been emphasized to keep fuel free from dirt, but the water problem has never been taken too seriously. Since other problems of fueling have previously arisen and have been taken care of, the water problem is gradually coming into the picture as a major source of trouble. It heretofore has been overshadowed and not recognized as a major troublemaker.

Water is not always present like dirt or sediment, and hence only causes trouble occasionally. Water finds its way into fuel in devious ways, most of which are not immediately recognized or discernible by the personnel responsible. Perhaps the major reason for its presence is wide atmospheric temperature variations which cause condensation to form within the storage equipment, with the resultant water ultimately finding its way into the fuel oil in surprisingly large amounts. Water through ground seepage or as the result of heavy rains has been known to contaminate the fuel in large amounts within a relatively short period of time. Confronted with such unpredictable possibilities for contaminating fuel with water a few precautions are usually taken, and everything moves along until another batch of wet fuel is encountered.

A few of the advantages of a water separator unit are as follows: (1) It prevents frozen fuel lines; (2) protects injectors; (3) reduces carbon formation; (4) improves engine efficiency; (5) is inexpensive insurance. All of these advantages result in decreased maintenance costs.

In one particular instance in which a dehydrator, or water separator, was installed, enough water was present in the fueling line to freeze, and as the pump was started, this column of ice was forced into the meter of the fuel supply system. As a result the meter was ruined. In many cases filter cartridges have become clogged with water with the result that no fuel could be delivered and the cartridge life was lost.

Because of the important part played by the injectors in the operation of the engine, the care of these important parts cannot be over-emphasized. If any water is present in the fuel which is already in an injector, this will cause trouble, because the plunger and barrel are made to very close tolerances. In fact, if the plunger is held in the hand a few minutes it cannot be inserted in the barrel due to expansion. A drop of water in the free state or emulsified water and fuel have both been known to cause an injector to seize. If a slug of water goes into an injector, the

(*Continued on page* 594)

ALADDIN LUBRICATOR

$178.00
delivered

Only one moving part:

The "Aladdin" has no pumps or valves. A spring-loaded piston, the *only* moving part, descends in a cylinder under vibration from traffic—and delivers the required amount of standard grease *automatically* to the running side of the rail.

One-man installation:

No track alteration, rail drilling or gauge widening is required to install the "Aladdin". And since it weighs only 50 pounds—it can be handled and installed by one man *in less than half an hour.*

Proved performance:

Today, thousands of "Aladdin" Lubricators are in use on main lines...in yards...under one or two-way traffic...in all climates. The "Aladdin's" low cost means you can now economically specify a lubricator for *every* rail wear location. Why not check *your* lubricator requirements today? Write for Bulletin A.

H. T. KENNEDY COMPANY, Inc., 37 Wall St., New York 5, N.Y.

heat absorbed by this water will cause seizing between the plunger and barrel. If water gets into an injector and is forced on into the combustion chamber, it will accelerate carbon formation on the injector tips necessitating more frequent changing of injectors.

Engine efficiency will not be at its maximum if one or more of the small openings in the tip of the injector are plugged. If one injector delivers less fuel because of a plugged opening, this cylinder will be starved, and as a result the engine will not run smoothly, resulting in loss of power.

A water separator may well be classified as "insurance." A "wet" batch of fuel immediately produces the cause for unnecessary expense. A new set of injectors for one diesel will offset the original cost of the necessary dehydration equipment.

Locomotive manufacturers advise that while water-free fuel is desired, no more than a maximum of 1 20 of 1 per cent of water should ever be present in the fuel. Fuel samples have been taken at different railroad fueling points and as much as 1 per cent water has been found. Where high water content existed a high maintenance cost was the result. Much of this water is in the emulsified state and is not easily detectable.

Put Dehydrators on Engines

By W. D. Gibson
Water Service Engineer, Chicago, Burlington & Quincy, Chicago

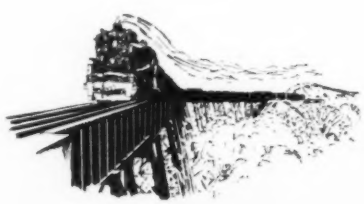
It seems to me that the question as propounded does not permit a true comparison of the respective merits of the two types of equipment mentioned. Obviously a combined water remover and filter is intended for both purposes, while the pressure type cartridge filter is primarily designed only for oil filtration. No claims are made for its efficiency in water removal. This being the case, the real question appears to involve a comparison between the so-called combined equipment plus separate filters and water-removal equipment. It is conceded that water in appreciable quantities in diesel fuel can be injurious to the engines in various ways. In fact, the maximum percentage of 0.05, or in the ratio of about five gallons of water in 10,000 gal. of oil, is all that is considered allowable. Consequently, if water is regularly present in greater percentages, some method of removal is indicated. This can be done by the use of equipment designed for the purpose or perhaps more effectively by careful and proper handling of the oil in unloading, storage and distribution.

We feel that the primary consideration is oil filtration for the removal of sediment. It is reported that there is an increasing amount of sludge-forming elements in the oil as it is being received, particularly in those oils produced by catalytic cracking. It is also the opinion of some that this type of oil is reacting with the steel in the tank cars resulting in the formation of as iron rust deposit. This deposit seems to accelerate the forming of sludge in the storage tanks and for this reason filtration, both in unloading and distribution, is being advocated. Pressure-type removable cartridge filters have proven very satisfactory for sediment filtration.

We think that water in the fuel can largely be controlled by proper handling and storage. Overhead unloading rather than dumping from the tank-car bottom will prevent water which may have accumulated in the transport car from getting into the storage tank. The vertical unloading pipe which is lowered into the tank should be arranged so that 1 in. or more of fluid is left in the car bottom.

Above-ground storage is to be desired as it permits leaving a volume in the tank bottom for the collection of water and sediment. Regular and systematic drainage of this mixture will greatly diminish the possibility of water accumulation in the fuel. Such an arrangement is not practicable in underground tanks and most cases of water accumulation that have come to our attention have been in this type of tank. Regular sampling of both incoming and storage oil, with subsequent laboratory analysis, is also an important factor in maintaining clean and water-free oil.

It is the feeling of many persons interested in the maintenance and operation of diesel locomotives that a great deal of trouble which has been experienced from water has been due to water collecting in the fuel tanks of the locomotives themselves. Breathing caused by fluctuating levels of oil in the tank sometimes causes moisture-laden air to be drawn into the tanks and later condensed by lower temperatures. On this premise there are opinions that if water-removal facilities are to be installed, they should be on the individual locomotives.



What Our Readers Think

MORE ABOUT PAINT

To the Editor:

IN THE What's the Answer department of your January issue appeared several answers to a question regarding the relative merits of proprietary paints and those made up in accordance with the purchaser's specifications.

I note that these answers favor the use of a good quality paint from the standpoint of its being a better investment. I think there are other angles to this situation that are more important. For instance the fixed formulations deprive the purchaser of any improvements developed in the laboratories of the paint manufacturers. Also, they do not permit the substitution of other ingredients that are made necessary by reason of the prevailing shortages of various raw materials. I think it is also a fact that when materials are compounded under railroad specifications the manufacturers are relieved from assuming responsibility for the performance of their paints after application, whereas they do stand back of their own standard brands.

We have been thinking along these lines for a good many years, but the purchasing department is reluctant to make any change because of the opinion that it would seriously complicate the job of getting competitive bids. I am in hopes that a satisfactory specification can be worked up, which will stipulate performance rather than ingredients of paints. This will then make it possible for our people to purchase manufacturers' standard brand paints on a competitive basis.

S. E. Kvenberg
Assistant Engineer
Chicago, Milwaukee, St. Paul & Pacific

Here's one 19,812 feet long...

The Elgin, Joliet and Eastern Railroad's main track includes continuous welded rail sections up to 19,812 feet long. By the end of 1951, additional super length rails will bring the total of continuous track in the System up to 90 miles. Welded joints produced through OXWELD'S RIBBONRAIL service and equipment eliminates the expense encountered in maintaining thousands of standard rail joints. No wonder minor track repairs on the "J" have already been reduced 50 to 75% in continuous rail territories.

Similar track maintenance savings are possible on your railroad. Let us discuss RIBBONRAIL Pressure Welding Service with you. Write today.

Want full details of the "J's" experience with continuous rail? Write for free booklet F-7772.

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
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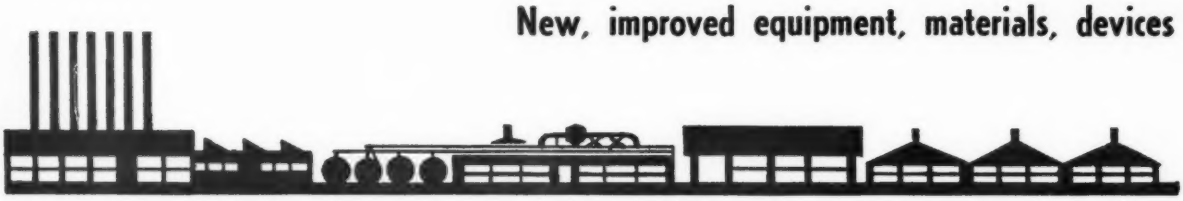
PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices



(For additional information on any of the products described in these columns, use postcards, page 599)

BITUMINOUS MIXER

THE Kwik-Mix Company, a subsidiary of Koehring Company, Milwaukee, Wis., has announced that it is now offering for railway use a portable, non-tilting bituminous mixer that is said to have had wide usage in the last year by contractors and municipalities.

Furnished on four pneumatic-tired wheels for portability or on skids for central-mix locations, the mixer is of the pug-mill type, equipped with a charging skip, asphalt pump and piping, asphalt-measuring, tip-over type tank, and burners and fuel tank to supply heat to the mixing drum while in operation.

Mixing blades, specially designed for bituminous materials, give pug-mill action by thoroughly working the aggregates and oil from end to center of the drum. This is said to coat all the aggregate quickly, giving the minimum batch-time cycle. After mixing, a full batch can be dumped in six seconds. Although each unit is provided with heaters for batching "hot mixes," emulsified and cut-back asphalts can be used in the mixer to produce "cold mixes" if desired.

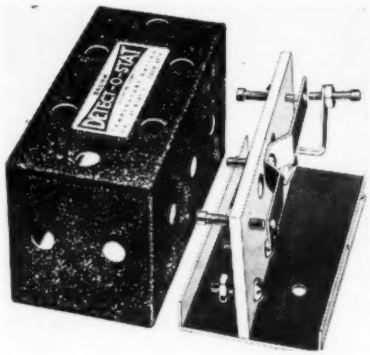
An auxiliary loader can be attached to the mixer, as shown in the photograph, to handle the mixed material from ground to truck or to a railroad gondola if desired. The mixer is available in two sizes, one delivering 10 cu. ft. of mixed material and the other 14 cu. ft.

WINDOW FOR ROLLING DOORS

THE Cornell Iron Works, Inc., Long Island, N. Y., is now producing a full-vision window for use in rolling steel doors. The window can be furnished in 12-in., 16-in., 20-in., or 24-in. heights and is 20 in. in width. Two or more can be used in larger doors. The window is presently furnished with transparent aeroplane plastic glazing which is shaped to coil with the door. It can be installed in new as well as existing rolling doors.

FIRE PROTECTION DEVICE IS DOUBLE-ACTING

A NEW principle of fire detection and property protection has been announced by the Racine Equipment & Material Co., Inc., Racine, Wis. Known as the Detect-O-Stat, it is a thermostatic warning device designed to provide complete fire detection service. The dual action is accomplished by two temperature-sensitive contacts. The first contact closes at a lower temperature, and the second contact closes at a higher temperature. In this way the device first provides detection of a local fire as temperature rises, activating the first setting. Acces-



sory signals such as bells or alarm lights give warning of the blaze. The second contact sets off further audible or visual signals at a central control station or outside the building, in event the first signal goes unheeded. A third contact called a "cold detector" activates warning signals at dropping temperatures, preventing damage to perishable merchandise as a result of frost and cold.

Designed to meet highest testing laboratory requirements, Detect-O-Stat temperature ratings are shadow-gauge set for critical temperature operation at an overall temperature range of 10 deg. F. to 200 deg. F. After activation, the contacts return to the normal open position automatically.

How to keep snow and ice from freezing your switches

With a General Electric snowmelter system you can forget about frozen switches in tough winter weather. The heart of this system is the well-known Calrod* heating unit which is clamped on rails at switchpoints and crossovers. When a storm approaches, remote-controlled snowmelters distribute safe heat evenly at these vital points, without danger of burning ties or rolling stock. G-E snowmelters cost only a few cents per hour per switch to operate, are ever ready to start working when you need them, and require practically no maintenance or attention.

Plan now for your winter snowmelting needs. Before you submit your 1953 budget, ask your General Electric representative for the full details on the G-E Snowmelter system. ***General Electric Company, Schenectady 5, New York.*** 152-3

*Reg. Trade-mar

You can put your confidence in—

GENERAL ELECTRIC

THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers

Changes in Railway Personnel

General

Richard F. Dunlap, assistant roadmaster on the Norfolk & Western, has been appointed assistant yardmaster, with headquarters as before at Pulaski, Va.

F. H. Boulton, assistant engineer in charge of the miscellaneous department of the chief engineer's office of the Louisville & Nashville at Louisville, Ky., has been promoted to assistant to the general manager, with the same headquarters.

C. E. R. Haight, division engineer on the Saratoga division of the Delaware & Hudson at Albany, N. Y., has been promoted to assistant superintendent of the Saratoga-Champlain division, with headquarters at Plattsburg, N. Y.

H. H. Hill, superintendent of the Richmond district of the Atlantic Coast Line, and formerly general roadmaster at Rocky Mount, N. C., has been appointed superintendent of transportation of the Northern Division at Savannah, Ga. **M. L. Horton,** roadmaster at Rocky Mount, has succeeded Mr. Hill as superintendent of the Richmond district, with headquarters continuing at Rocky Mount.

M. I. Dunn, superintendent freight transportation of the Chesapeake & Ohio at Richmond, Va., and an engineer by training and experience, has recently been appointed general manager, with headquarters at Richmond.

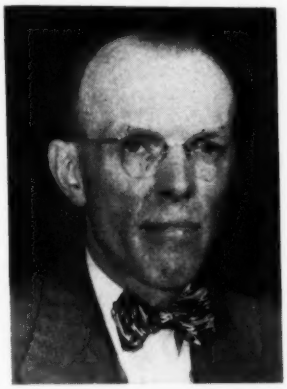
Mr. Dunn joined the road as a rodman in 1916, resigning two years later to enter college. After graduation from Washington & Lee University in 1923, Mr. Dunn

M. I. Dunn

re-entered the service of the C.&O. as an instrumentman in the construction department at Huntington, W. Va. He has also served as assistant engineer in the maintenance of way department at Clifton Forge, Va., assistant division engineer at Richmond, assistant division engineer and division engineer at Huntington, trainmaster at Handley, W. Va., and St. Albans, W. Va., and trainmaster, division superintendent and general superintendent at Peru, Ind. Mr. Dunn became superintendent freight transportation in March 1951.

Donald A. Logan, assistant superintendent of the Erie at Jersey City, N. J., and an engineer by training and experience, has recently been appointed superintendent of the Wyoming and Jefferson divisions with headquarters at Dunmore, Pa.

Mr. Logan was born at Warren, Pa., and attended Antioch College and the University of Pittsburgh. He joined the Erie at Meadville, Pa., in 1930 as a transitman on the engineering corps and advanced successively to assistant section foreman, general foreman at Marion,



Donald A. Logan

Ohio, and Buffalo, N. Y., supervisor at Kent, Ohio, assistant division engineer at Youngstown, Ohio, and inspector of operation at Cleveland, Ohio. Mr. Logan was appointed trainmaster at Hornell, N. Y., in 1940, transferring to Susquehanna, Pa., in 1941, Dunmore in 1942 and Jersey City in 1946. He was promoted to assistant superintendent at Jersey City in April 1951.

W. G. Pfohl, superintendent of freight transportation of the Eastern region of the Pennsylvania, and an engineer by training and experience, has been named superintendent of the Conemaugh division at Pittsburgh succeeding **W. G. Dorwart,** who has been transferred.

Mr. Pfohl was born at Princeton, Ind., and was graduated from Purdue univer-

(*Continued on page 602*)

New Caterpillar Tractor Company plant at Joliet, Ill., has in production two models of tractor-drawn wagons, two sizes of rippers, 27 different types of bulldozers, nine models of scrapers, four types of cable controls and two models of hydraulic controls. The plant, which employs about 3,600 persons, has 697,040 sq. ft. under roof.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

Photo courtesy of Spray Services, Inc.

ESTERON BRUSH KILLER

Dow research and manufacturing know-how have gone all-out to make Esteron® Brush Killer the best product in its field. This result-getting formulation is a mixture of low volatility propylene glycol butyl ether esters of 2,4-D and 2,4,5-T. Extensive use by railroads and service organizations in all sections of the country at all seasons of the year has *proved* it the *best* product for right-of-way brush and weed control.

Included in your maintenance program, Esteron Brush Killer will give you good control of alder, ash, birch, brambles, cherry, elm, hickory, maple, oaks, osage orange, poison ivy, sumac, willow and other hard-to-kill woody plants. In addition to brush, broad-leaved weeds are controlled in the same application. It will also control resprouting of stumps when it is applied in oil soon after cutting.

Also recommended for woody plant control—especially 2,4-D resistant species—is Esteron 245 containing low volatility propylene glycol butyl ether esters of 2,4,5-T. This product also gives outstanding results in year-around stump treatment and basal bark application. For controlling Johnson, quack, Bermuda and other tough perennial and annual grasses, use Dow's proved grass killer, Sodium TCA 90%.

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sity in 1928, entering the service of the Pennsylvania the following year as an assistant on the engineering corps at Pittsburgh, Pa. After service as a supervisor of track and assistant division engineer, he was promoted to division engineer of the Maryland division in 1946. He became assistant superintendent of freight transportation of the Central region at Pittsburgh in 1948 and assistant superintendent of the Eastern division at Toledo, Ohio, in 1950. He was named superintendent of freight transportation of the Eastern region in June 1951.

W. G. Pfohl

Timothy G. Sughrue, executive vice-president of the Boston & Maine and the Maine Central, and former chief engineer of those roads, has been appointed president of the Boston & Maine, succeeding **E. S. French,** who has retired.

Mr. Sughrue was born at Nashau, N. H., on February 22, 1889, and attended the Nashau High School and the University of New Hampshire. During his college years he worked for the railroad as a sectionman and yard clerk, and after leaving the university in June 1909, returned to it as a sectionman. Two months later he became a chainman, in 1910 a rodman, in 1911 a draftsman and in 1914 assistant supervisor of bridges and buildings. Four years later he was promoted to supervisor of bridges and buildings and in 1927 was appointed division engineer of the road's Terminal division. In 1939 he became engineer maintenance of way of the Maine Central and the Portland Terminal at Portland, but three years later he returned to Boston as chief engineer of the Boston & Maine, the Maine Central, and the Portland Terminal. He was elected executive vice-president of the three companies in January 1949.

Timothy G. Sughrue

Mr. Sughrue was awarded an honorary degree of Doctor of Engineering by the University of New Hampshire in 1945.

David E. Smucker, assistant chief engineer of the Pennsylvania, has been appointed director of the Defense Transport Administration's Railroad Transport Division. He succeeds **Elmer J. Stubbs,** who has resigned to assume his former duties as assistant vice-president of the Erie.

Mr. Smucker was born at West Liberty, Ohio, on October 3, 1907, and attended the University of Cincinnati, receiving the degree of Bachelor of Science in civil engineering from Ohio State University in 1929. He entered railroad service on May 23, 1929, as assistant on the engineering corps, Philadelphia Terminal division of the Pennsylvania. On August 1, 1929, Mr. Smucker was appointed assistant supervisor of track, which position he held successively on the Delaware, Philadelphia, Baltimore and Philadelphia Terminal divisions. He became supervisor of track on April 9, 1934, and served in that capacity on the Delaware and Maryland divisions until June 16, 1936, when he was promoted to assistant division engineer of the Fort Wayne division. He was named division engineer of the Toledo division on October 1, 1940, and on January 16, 1942, was promoted to assistant superintendent of freight transportation at the Chicago general office. Mr. Smucker served as superintendent of the Indianapolis division from January 16, 1943, until May 16, 1944, when he was transferred to the Fort Wayne division. He was transferred in the same capacity to the Pittsburgh division in April, 1946, and was appointed general manager of the Long Island in March, 1948. He served in the latter capacity until April, 1949, when he was named co-trustee and chief operating officer of the Long Island. He resigned the latter position in December, 1950, to assume the duties of assistant chief engineer of the Pennsylvania.

David E. Smucker

Engineering

M. S. Miller, special engineer on the Reading at Philadelphia, Pa., has retired after more than 42 years of service. The position of special engineer has been abolished.

Howard F. Schryver, special engineer on the New York Central, with headquarters at Cleveland, Ohio, has retired after 45 years of railroad service.

J. W. Thomas, assistant division engineer on the Alabama division of the Seaboard Air Line at Americus, Ga., has been transferred to the North Florida division at Jacksonville, Fla.

Robert J. Klueh, supervisor of track on Subdivision 25, Pennsylvania division, of the New York Central at Wellsboro Junction, Pa., has been promoted to assistant engineer of bridges, Buffalo and East, with headquarters at New York.

D. C. D. Todd, supervisor of structures on the iPttsburgh division of the Pennsylvania, has been appointed assistant engineer in the office of the chief engineer maintenance of way of the Central region, with headquarters as before at Pittsburgh, Pa.

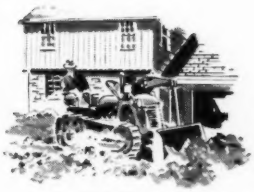
H. A. Connor, locating engineer on the Canadian National at Sherridon, Man., has been appointed division engineer of the Portage-Brandon division. **J. H. Spicer,** assistant engineer on the Port Arthur and Portage-Brandon divisions, has been promoted to division engineer at Prince Rupert, B.C., to succeed **R. C. Davison,** who has retired after 32 years of service.

J. D. Fraser, whose promotion to division engineer on the New York Central at Columbus, Ohio, was recently announced (R.E.&M., April, p. 418), began his career with the New York Central as a rodman in the district engineer's office in New York on September 21, 1927. He was promoted to assistant supervisor of bridges and buildings at Detroit in July, 1941, to supervisor of bridges and buildings in 1944, and to assistant division engineer at Bay City, Mich., in January, 1948. He became assistant division engineer at Jackson, Mich., on March 1, 1949, Which position he held until his recent promotion.

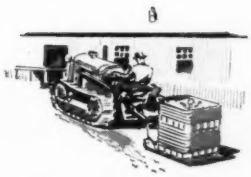
P. S. Settle, assistant division engineer on the Pennsylvania at New York, has been promoted to division engineer at Williamsport, Pa., to succeed **J. E. Chubb,** who has been transferred to Baltimore, Md. Mr. Chubb has replaced **N. L. Fleckenstine,** who has been transferred to special duty, office of the vice-president, Eastern region. **J. T. Evans,** supervisor of track at New York, has been advanced to assistant division engineer to succeed Mr. Settle. **C. R. Uitts,** assistant engineer at Philadelphia, Pa., has been transferred to the office of the chief engineer of the Eastern region, and **O. W.**

(*Continued on page* 604)

Loading out scrap material



Bulldozing



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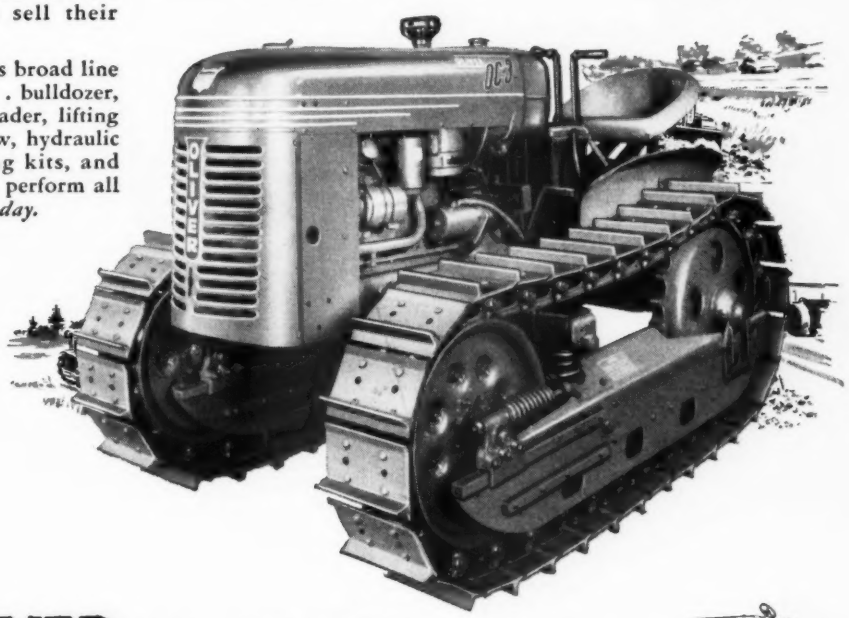
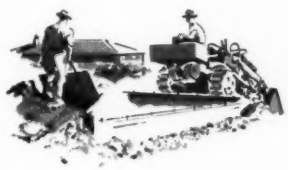
Sidewalk snow plowing

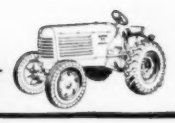
Loading out topsoil

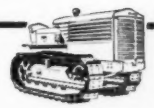




Winch operations

THE OLIVER CORPORATION





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Railway Personnel (Cont'd)

Kemmerer, draftsman at New York, has been appointed assistant engineer to replace Mr. Uitts at Philadelphia.

K. E. Dunn, whose appointment as special engineer in the office of the vice-president of the New York Central at Chicago was recently announced (R.E.& M.) April, p. 418), was born April 28, 1913, and entered the service of the New York Central on October 8, 1936, as a draftsman at Chicago. In May 1941 he was appointed engineer-draftsman at Cleveland, Ohio, and on October 1, 1946, he was named assistant division engineer at Columbus. He was promoted to division engineer January 1, 1951, the position he held prior to his recent promotion.

J. S. Murphy, assistant to the division engineer on the Illinois Central at Memphis, Tenn., has resigned to accept a position as construction engineer with the Mississippi & Skuna Valley. **N. R. Forbes,** supervisor of track on the Mississippi division at Corinth, Miss., has been promoted to assistant to division engineer at Memphis, replacing Mr. Murphy.

E. E. Crowley, roadmaster on the Delaware & Hudson, has been promoted to division engineer on the Saratoga division, with headquarters as before at Albany, N. Y., to succeed **C. E. R. Haight,** who, as announced elsewhere in these columns, has been appointed assistant superintendent of the Saratoga-Champlain division at Plattsburg, N. Y. **J. H. Phillips** bridge and building master, has been appointed assistant division engineer on the Saratoga division, with headquarters continuing at Albany.

A. W. B. Fish whose appointment as division engineer on the Canadian Pacific at Lethbridge, Alta., was recently announced (RE&M, May 1952, p. 506), was graduated from the University of Alberta in 1941 and spent four years with the Northern Alberta Railways at Edmonton, Alta., before entering the service of the Canadian Pacific as a transitman at Calgary, Alta. He was appointed roadmaster at Banff, Alta., in 1949, and a year later was transferred to Consul, Alta., in that capacity, the position he held at the time of his recent promotion.

J. F. Warrenfells, Jr., who, as recently announced (RE&M, April, p. 416), has been appointed principal assistant division engineer on the Seaboard Air Line at Raleigh, N. C., was born at Lafayette, Ga., on January 19, 1914, and received his higher education at the University of Chattanooga. He entered the service of the Seaboard as assistant to division engineer at Savannah, Ga., in September 1942. Mr. Warrenfells was appointed assistant master carpenter in October 1943 and master carpenter in July 1945, with headquarters continuing at Savannah. He was serving in the latter capacity when he received his recent promotion.

James R. Fraser, whose appointment as assistant division engineer on the Seaboard Air Line at Raliegh, N. C., was re-

cently announced (RE&M, April, p. 416), was born at Belize, British Honduras, on March 27, 1924. Following his graduation from Georgia Institute of Technology with the degree of Bachelor of Science in civil engineering on June 12, 1950, he entered the service of the Seaboard as a student engineer at Jacksonville, Fla. On May 15, 1951, Mr. Fraser was appointed assistant to division engineer at Jacksonville, and the following October was transferred in the same capacity to Raliegh where he remained until he received his recent promotion.

S. Turner Watson, who, as recently announced (RE&M, April, p. 415), has been appointed division engineer on the Atlantic Coast Line, with headquarters at Savannah, Ga., was born at Bradenton, Fla., on December 6, 1924, and was graduated from the University of South Carolina with the degree of Bachelor of Science in civil engineering in 1945. He entered the service of the Coast Line as an instrumentman at Florence, S. C., on February 1, 1947. The following May he was named junior engineer, and on May 1, 1948, was appointed assistant engineer. Mr. Watson was promoted to senior assistant engineer at Florence on September 16, 1950, and served in that capacity until his recent appointment as division engineer.

Charles H. Wiggins, whose appointment as assistant division engineer on the Seaboard Air Line at Miami, Fla., as announced in the May issue, was born at Tavares, Fla., on July 16, 1913, and was graduated from the University of Florida with the degree of Bachelor of Science in civil engineering in February 1938. The following March he entered the service of the Seaboard as an apprentice foreman at Waldo, Fla. On June 5, 1939, Mr. Wiggins was appointed assistant to division engineer at Jacksonville, Fla., and served subsequently at that location as assistant master carpenter and assistant division engineer. On March 29, 1950, he was appointed assistant roadmaster at Savannah, Ga., which position he held until his recent appointment.

A. G. Rankin, assistant engineer in the bridge department of the Texas & Pacific at Dallas, Tex., has been appointed bridge engineer, succeeding **C. P. Howes,** who has retired.

Mr. Rankin first entered the service of the Texas & Pacific in 1928. From 1938 to 1944 he served as designing engineer for the Texas state highway department, returning to the railway in 1944 as assistant engineer.

Mr. Howes, a graduate of the Massachusetts Institute of Technology, entered the engineering field in 1904. He served overseas with the army engineers in World War I, and in 1919 entered the service of the Texas & Pacific at Dallas as bridge engineer.

G. R. Sproles, division engineer on the Louisville & Nashville at Mobile, Ala., has been promoted to assistant engineer in charge of the miscellaneous department, chief engineer's office at Louisville, Ky., succeeding **F. H. Boulton,** whose

(*Continued on page* 606)

Railway Personnel (Cont'd)

promotion to assistant to the general manager at Louisville is noted elsewhere in these columns. **C. E. Stoecker,** assistant division engineer at Evansville, Ind., has been promoted to division engineer at Mobile, succeeding Mr. Sproles. **C. F. Anderson,** assistant supervisor of bridges and buildings at Louisville, has been promoted to assistant division engineer at Evansville, succeeding Mr. Stoecker. **Edgar Garrett,** supervisor of track at Birmingham, Ala., has been promoted to assistant division engineer at Radnor, Tenn. **George R. Wurtele,** assistant engineer at Evansville, has been promoted to assistant engineer in the special engineer's office at Louisville, succeeding **N. C. Kieffer,** whose promotion to assistant supervisor of bridges and buildings at Louisville is noted elsewhere in these columns. **Joe Hays, Jr.,** draftsman in the miscellaneous department of the chief engineer's office at Louisville, has been promoted to assistant engineer at Evansville, succeeding Mr. Wurtele.

Lawrence T. Ferguson, whose appointment as engineer of track on the Union Pacific at Omaha was recently announced (R.E.&M., April, p. 415) was born in 1906 at Lexington, Neb. Mr. Ferguson joined the maintenance of way department of the Union Pacific in 1923, and in 1933

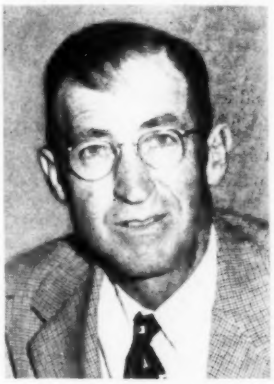
Lawrence T. Ferguson

was promoted to roadmaster at Kearney, Neb. In 1941 he was promoted to general roadmaster of the Nebraska division, the position he held prior to his recent promotion.

Ralph H. Meintel, whose appointment as assistant engineer in the office of chief engineer maintenance of way of the Pennsylvania at Philadelphia was recently announced (RE&M, April, p. 418), was born at Altoona, Pa., on October 6, 1900, and was graduated from Pennsylvania State College with the degree of Bachelor of Science in 1923. During vacations he worked for the Pennsylvania as a laborer and chainman and, following graduation, entered into regular service as a rodman at Altoona, Pa., transferring in that capacity to Harrisburg, Pa., on July 1, 1924. Mr. Meintel was promoted to assistant

supervisor of track at Trenton, N. J., on November 16, 1926, and two years later was advanced to supervisor of track at Oil City, Pa., subsequently serving as supervisor of track successively at New Castle, Pa., Carnegie, Pa., and Huntingdon, Pa. On June 1, 1939, he was appointed assistant division engineer at Fort Wayne, Ind., and a year later was advanced to division engineer on the Eastern division with headquarters at Pittsburgh, Pa. On July 1, 1943, he was transferred in the latter capacity to Buffalo, N. Y., where he remained until November 1, 1949, when he resumed the position of assistant division engineer on the Pittsburgh division at Pittsburgh, the position he held at the time of his recent appointment.

A. L. McHenry, whose promotion to division engineer on the Northwestern Pacific at San Rafael, Cal., was announced recently (RE&M, April, p. 416), was born



A. L. McHenry

January 17, 1903, at Paola, Kan. He entered the service of the Southern Pacific on the Tucson division as a helper on a signal gang in September 1924. In 1926 and 1927 he worked at Tucson as a signal draftsman, and from 1927 until 1943 served as instrumentman, draftsman, assistant engineer, and general track foreman—all on the Tucson division. From 1943 to 1947, Mr. McHenry served as assistant division engineer on the Tucson division and in the latter year was promoted to senior assistant division engineer at that location, the position he held prior to his recent promotion.

Track

David G. Fowler has been appointed assistant supervisor of track on the Central of New Jersey at Somerville, N. J.

W. E. Ward, assistant cost engineer on the Chesapeake & Ohio at Raliegh, N. C., has been appointed supervisor of track at Thurmond, W. Va.

D. C. Ruschman, assistant supervisor of track on the Chicago division of Pennsylvania at Colehour, Ind., has been transferred to the Middle division, with headquarters at Lewistown, Pa.

Louis Smith, assistant supervisor of

(*Continued on page* 608)

Railway Personnel (Cont'd)

maintenance of way on the Aliquippa & Southern, has been promoted to supervisor of maintenance of way to succeed **Merritt Rose,** who, as announced elsewhere in these columns, has been appointed assistant superintendent.

N. C. Kieffer, assistant engineer in the special engineer's office of the Louisville & Nashville at Louisville, Ky., has been promoted to assistant supervisor of bridges and buildings at Louisville, succeeding **C. F. Anderson,** whose promotion to assistant division engineer at Evansville, Ind., is noted elsewhere in these columns.

T. F. Maloney, Jr., assistant supervisor of track on Subdivision 4, Eastern division, of the New York Central at Hudson, N. Y., has been promoted to supervisor of track on Subdivision 25, Pennsylvania division, at Wellsboro Junction, Pa., to succeed **Robert J. Klueh,** who, as announced elsewhere in these columns, has been advanced to assistant engineer of bridges at New York.

H. F. Davenport, supervisor of track on the Memphis division of the Illinois Central at Tutwiler, Miss., has been transferred to Cornith, Miss., replacing **N. R. Forbes,** whose promotion to assistant to division engineer at Memhpis is noted elsewhere in these columns. **D. H. Yazell,** has reassumed the duties of supervisor of track at Tutwiler, after having served with the armed forces, replacing Mr. Davenport.

D. L. Sinclair, assistant roadmaster on the Allandale division of the Canadian National, has been promoted to roadmaster on the Capreol division with headquarters at Capreol, Ont. He will have jurisdiction over the Sudbury subdivision and Sudbury terminals subdivision. Born at Katrine, Ont., Mr. Sinclair joined the maintenance-of-way department of the C. N. R. in 1929 as a laborer at Burks Falls, Ont. Later the same year he was made sectionman and served in that capacity at various points on the northern Ontario district. He was appointed assistant roadmaster on the Allandale division in 1949.

Robert F. Cole, who was recently appointed supervisor of track on the Pennsylvania at Northumberland, Pa., (RE&M, April, p. 420) was born at Glenoak, Wis., on September 25, 1925. Following graduation from the University of Wisconsin with the degree of Bachelor of Science in civil engineering on June 19, 1948, Mr. Cole entered the service of the Pennsylvania as a junior engineer at Fort Wayne, Ind. He was advanced to assistant supervisor of track at Cleveland, Ohio, on June 16, 1949, and a year later was transferred in that capacity to Huntingdon, Pa., where he remained until he received his recent promotion.

Jack E. Greene, assistant supervisor of track on the Southern at Culpeper, Va., has been promoted to supervisor of track at Charleston, S. C., to replace **Charlie B. Foster,** who has been transferred to Manassas, Va., to succeed **J. M. Bolding,**

deceased. **Russell C. Hopkins** has succeeded Mr. Greene at Culpeper. **Roy P. Taylor, Jr.**, student apprentice at Charlotte, N. C., has been advanced to assistant supervisor of track at Greenville, S. C.; **Robert W. Fondren,** also a student apprentice at Charlotte, has been advanced to assistant supervisor of track at that location; and **Roy T. Walley** has been appointed assistant supervisor of track at Laurel, Miss. **Quinnie W. Houchin,** assistant supervisor of track at Birmingham, Ala., has been transferred to York, Ala.

Harry T. Matthews, who has been appointed supervisor of track on the Pennsylvania at Morrisville, Pa., was born at Baltimore, Md., on January 17, 1900. Entering the service of the Pennsylvania on January 2, 1918, as a laborer at Baltimore, Md., he was appointed a track foreman on August 1, 1924, and served in that capacity and as general foreman at various locations until July 26, 1943, when he was advanced to assistant supervisor of track at Downington, Pa. On November 1, 1944, Mr. Matthews was promoted to supervisor of track at Chambersburg, Pa., and four years later was transferred to Earnest, Pa. From November 16, 1949, until his recent appointment as supervisor of construction he served as track foreman at Baltimore.

Water Service

Peter J. Calza, who has been promoted to engineer of water service on the Chicago, Rock Island & Pacific (RE&M, April, p. 421), was born on December 15, 1913, at Thurber, Tex. He graduated from the University of Colorado in August 1936 and entered railroad service in 1937 as a chainman on the Denver & Rio Grande Western at Cisco, Utah. In September 1938 Mr. Calza joined the Rock Island as a field draftsman at Liberal, Kan., and

Peter J. Calza

after serving on location parties in Iowa, Missouri and Kansas, was promoted to rodman on the Panhandle division at Dalhart, Tex., in May 1941. In 1943 he was promoted to instrumentman at Liberal, Kan., and in 1949 was promoted to master carpenter at Dalhart, the position he held prior to his recent promotion.

(*Please turn to page* 610)

Railway Personnel (Cont'd)

Bridge and Building

W. J. Hopson has been appointed bridge and building supervisor on the Delaware & Hudson at Albany, N. Y. **J. H. Phillips,** bridge and building master at Albany, as reported elsewhere in these columns, has been promoted to assistant division engineer.

D. H. McKibben, assistant supervisor of structures on the Northern division of the Pennsylvania, has been promoted to supervisor of structures on the Delmarva division at Harrington, Del., to succeed **J. D. Moore,** who has been transferred to the Panhandle division at Pittsburgh, Pa., to replace **T. J. Atkinson,** who, in turn, has been transferred to the Pittsburgh division at Pittsburgh to replace **D. C. D. Todd,** whose appointment as assistant engineer in the office of the chief engineer maintenance of way of the Central region is announced elsewhere in these columns.

Special

M. M. Stansbury, supervisor of maintenance of way shop and equipment on the New York, Chicago & St. Louis, has been promoted to superintendent of maintenance equipment with headquarters as before at Bellevue, Ohio. The position of supervisor of maintenance of way shop and equipment has been abolished.

Obituary

Blanie E. Widder, retired engineer of buildings on the Atlantic Coast Line, died recently at the age of 60.

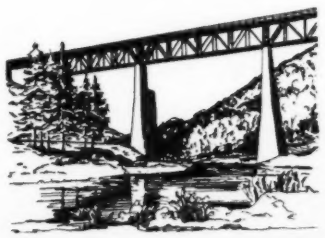
Walter S. Johns, retired assistant to chief engineer of the Pennsylvania at Philadelphia, Pa., died recently.

Bernard Herman, retired chief engineer of the Southern, died at Washington, D. C., on May 2 at the age of 76.

Association News

American Railway Engineering Association

Six standing committees have scheduled meetings to be held in June. The Committee on Buildings will meet at the



Engineering Library in Windsor Station, Montreal, Que., on June 5-6. On June 19-20 the Committee on Masonry will meet at the Parker House, Boston, Mass. The Committee on Highways will meet June 16-17 in New York City. On June 23-24 the Committee on Yards and Terminals will hold a meeting at the St. Paul Hotel, St. Paul, Minn. On June 26-27 the Committee on Economics of Railway Location and Operation will hold a meeting in Canada. The committee will meet in Montreal on the 26th and will proceed as a group to Quebec, Que., where a business meeting will be held at the Chateau Frontenac hotel on the 27th. On Saturday, the 28th, the committee will take a sight-seeing trip. The Committee on Maintenance of Way Work Equipment will meet June 9-10 at the Laurentien Hotel, Montreal. On the second day the committee will visit the Canadian National's shops where work equipment is repaired.

Metropolitan Maintenance of Way Club

The annual meeting of the club, with election of officers, was held on April 24 at the Hotel Shelburne, New York. In

(*Continued on page 612*)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 15-17, 1952, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 17-19, 1953, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting October 27. E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliances Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, October 22-24, 1952, Jung Hotel, New Orleans, La. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 15-17, 1952, Conrad Hilton (Stevens) Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

Association News (Cont'd)

addition to 117 members, there were eight guests in attendance.

The main feature of the evening was an open forum discussion led by J. P. Hiltz, Jr., engineer maintenance of way of the Delaware, Lackawanna & Western, who gave a talk on "'Long-Range' Maintenance as Practiced by the Lackawanna." The three points brought out in Mr. Hiltz' talk were answered by M. E. Condon, construction supervisor, Eastern district, Erie; W. C. Sheehan, supervisor of track, Lehigh Valley; and E. C. Lawson, supervisor of track, Reading.

In the election of officers Arthur Price, division engineer, Erie, was elected president to succeed E. L. Wilson, supervisor of track, New York Central; Ralph I. Frame, Board of Transportation, New York Subway System, succeeds Mr. Price as first vice-president; and Edward V. Grogan, supervisor of track, New York Central, succeeds Mr. Frame as second vice-president. John S. Vreeland, vice-president, Simmons-Boardman Publishing Corporation, was re-elected secretary-treasurer.

The next meeting of the club will be the annual outing, which will be held at the Out O'Bounds Aero & Golf Club at Suffern, N. Y., on Thursday, June 19.

Supply Trade News

General

The **Racine Tool & Machine Company**, Racine, Wis., formerly located at 1760 State street, has moved into a newly modernized plant, comprising some 50 per cent increase in manufacturing floor space, at 2000 Albert street, Racine. In addition the company has changed its name to **Racine Hydraulics & Machinery, Inc.**

Personal

Stanley M. Hunter, vice-president and director of the **American Hoist & Derrick Company,** St. Paul, Minn., has resigned. Mr. Hunter joined the sales department of the company in 1936 and successively served as general manager of sales, vice-president and director of sales, and executive vice-president.

Arthur H. Nelson has been appointed manager of electric tool sales for the Chicago branch of the **Independent Pneumatic Tool Company,** Aurora, Ill.

Henry M. Kidd, formerly sales manager of the spray painting equipment division of the **DeVilbiss Company,** has been appointed vice-president and sales manager at Toledo, Ohio.

W. L. Klatt, assistant manager of the weed control division of the **Pacific Coast Borax Company,** has been appointed Denver district manager of the division. **J. R. Parke,** formerly associated with the package division, has been named representative for the weed control division at Philadelphia, Pa.

J. R. Hutchison, has been appointed regional manager in the Middle East for the **Worthington Corporation,** Harrison, N. J. Mr. Hutchison will manage the company's activities in Cyprus, Egypt, Greece, Iran, Iraq, Israel, Lebanon, Syria, Trans-Jordan and Turkey, from his headquarters at Istanbul, Turkey.

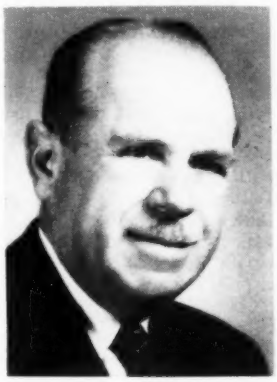
John F. Byrom, sales engineer of the railway division of the **Timken Roller Bearing Company,** Canton, Ohio, has been transferred from Chicago to Minneapolis, Minn.

R. A. Anderson, general sales engineer for the **L. B. Foster Company,** Pittsburgh, Pa., at Chicago, has been appointed regional manager for the Southwest area with headquarters at Houston, Tex. Mr. Anderson succeeds the late **J. B. Strauss.**

A. E. Dorn, Pacific Coast territory sales manager at Oakland, Cal., for the Tractor division of the **Allis-Chalmers Manufacturing Company,** Milwaukee, Wis., has been promoted to industrial sales manager of the Tractor division, with headquarters at Milwaukee, succeeding **R. M. Stone,** who has resigned to become associated with the Allis-Chalmers industrial

dealership in St. Louis, Mo. Mr. Dorn is succeeded by **L. W. Davis**, branch manager at Oakland.

Mr. Dorn began his career with Allis-Chalmers in 1934 and has served as industrial salesman at Omaha, Neb., assistant supervisor of grader sales, and Southwest industrial territory manager.



A. E. Dorn

He was appointed Pacific Coast sales manager in 1943.

Mr. Davis joined Allis-Chalmers in October 1939 and has served as assistant branch manager at Los Angeles, Cal., and branch manager at Pocatello, Ida. He was appointed branch manager at Oakland in 1951.

Kenneth I. Thompson has been appointed vice-president—sales of the **Oxweld Railroad Service Company**, a division of the **Union Carbide & Carbon Corp.** Mr. Thompson entered the industrial equipment business in 1921 with the Pennsylvania Pump & Compressor Co.

Kenneth I. Thompson

and later worked for the Lehigh-Fuller Company. In 1937 Mr. Thompson was associated with Ingersoll-Rand and in 1945 he joined Oxweld Railroad Service as eastern sales manager. He was named general manager in 1950, with headquarters in Chicago.

R. S. Jay, assistant sales manager of the Findlay division of **Gar Wood Industries**,

(*Continued on page* 614)

Supply Trade News (Cont'd)

Inc., has been promoted to sales manager of that division with headquarters at Wayne, Mich. Mr. Jay is succeeded by **R. M. Steegman**, Midwest District manager. **David J. Davis**, Southeast District manager, has been named assistant sales manager in charge of tractor equipment.

E. M. Stuart has been appointed district sales manager in the Northeastern region for the **Black & Decker Manufacturing Company**, Towson, Md., and **A. Lee Proctor** has been named sales manager for the Southeastern region. In addition, **Raymond G. Horner** has been appointed sales manager of the Central region, **William L. Poynter** has been named sales manager of the Midwest region, **Arthur S. Boehm** has been named sales manager of the Pacific Coast region, and **Donald S. McKeracher** has been appointed sales manager for Canada.

Joseph P. Kleinkort, formerly general sales manager of the Ramapo Ajax division of **American Brake Shoe Company**, has been appointed vice-president of the

Joseph P. Kleinkort

division. Mr. Kleinkort joined the Ramapo division at the East St. Louis plant in 1923. He entered the sales department in 1936 and was appointed district sales manager in 1945 and general sales manager in 1948.

Obituary

V. M. Dobeus, president and general manager of the **Tractomotive Corporation**, Deerfield, Ill., died recently at the age of 50.

Clifton D. Welcomb, technical supervisor for the Detroit district of the **Air Reduction Sales Company**, New York, passed away recently.

Clarence C. Rausch, assistant vice-president and manager of No-Ox-Id Rust Preventative sales, **Dearborn Chemical Company**, Chicago, died recently at the age of 57. Mr. Rausch had been with Dearborn for 32 years, becoming assistant vice-president in 1941. He was a member of the American Railway Engineering Association, the Roadmasters and Maintenance of Way Association of America, and the American Railway Bridge and Building Association.

Trade Publications

To obtain copies of any of the publications mentioned in these columns, use postcards, page 599.

Scrapers—The Caterpillar Tractor Company, Peoria, Ill., has recently released an illustrated leaflet describing the No. 10 and No. 15 Caterpillar scrapers, which are designed for use with the Caterpillar DW10 tractor. Complete specifications and dimensions of the two models are presented along with information concerning various features of their design and construction. Special mention is made of the several attachments that are available for use with the scrapers.

Tractor Maintenance—A 24-page, four-color, cartoon-type booklet, entitled "Maintenance Guide for Track-Type Tractors," has recently been issued by the Caterpillar Tractor Company, Peoria, Ill. The series of cartoons tells what hapepns when an owner and service technician compare notes and discuss basic methods of making tractors last longer and do better work at lower cost. Operating adjustments are explained and proper care of tractor components, such as tracks, seals, fuel system and filters, is shown. Also featured is the opportunity to economize by having the dealer rebuild worn tractor parts. The booklet was developed in combination with a tractor maintenance movie entitled, "A Thing or Two," which may be obtained by interested persons from local Caterpillar dealers.

Diesel Tractor—The various applications of the Caterpillar D4 diesel tractor are presented in a new catalog recently made available by the Caterpillar Tractor Company, Peoria, Ill. Some 30 photographs and many other illustrations are included in the 32-page booklet which explains, part-by-part, how the tractor is built, what it's like and how it performs. Attachments and specifications are listed and reports from actual D4 tractor owners on typical jobs are shown.

Ground Water Development—A 16-mm. sound motion picture has recently been completed by Layne & Bowler, Inc., Memphis, Tenn., and associated companies, on ground water development. Entitled, "Deep Water," the picture depicts a complete story of well water development from the initial survey through engineering, construction, testing and actual use, including "on the scene shots" of Layne men and equipment at work on water-development projects. The picture is available for showing without cost to all groups interested in ground water development for domestic and commercial uses.

Shovel Cranes—The Link-Belt Speeder Corporation, Cedar Rapids, Iowa, has issued an eight-page illustrated catalog, designated at Book No. 2373, which contains photographs together with brief descriptions and applications of 16 models of Link-Belt Speeder equipment. Of particular interest is a listing of "master books" which contain complete data on each model to augment the thumbnail description contained in this general line catalog. The new booklet contains information on the firm's complete line, ranging from one-half to three-yard capacities; 10 to 60 tons lifting capacity, and descriptions of crawler-mounted, wheel-mounted and truck-mounted equipment.

Wood Preservation—Detailed answers to the 51 most frequently asked questions about pentachlorophenol wood preservative are contained in a new 40-page booklet recently issued by the Monsanto Chemical Company, St. Louis, Mo. The answers presented are to those questions which have been asked most often of Monsanto representatives by lumber dealers, architects, contractors and home owners, and cover all phases of Penta wood treatment.

Material Handling—The Kwik-Mix Company, Port Washington, Wis., has issued an illustrated folder presenting a complete description of the Moto-Bug power wheelbarrow. Included in the four-page leaflet are some 25 illustrations which show the Moto-Bug employed on a variety of jobs when equipped with wheelbarrow, platform and fork life. Specifications and mechanical features of the device are also listed.

Advertisers IN THIS ISSUE

For additional information, use postcard, pages 599-600

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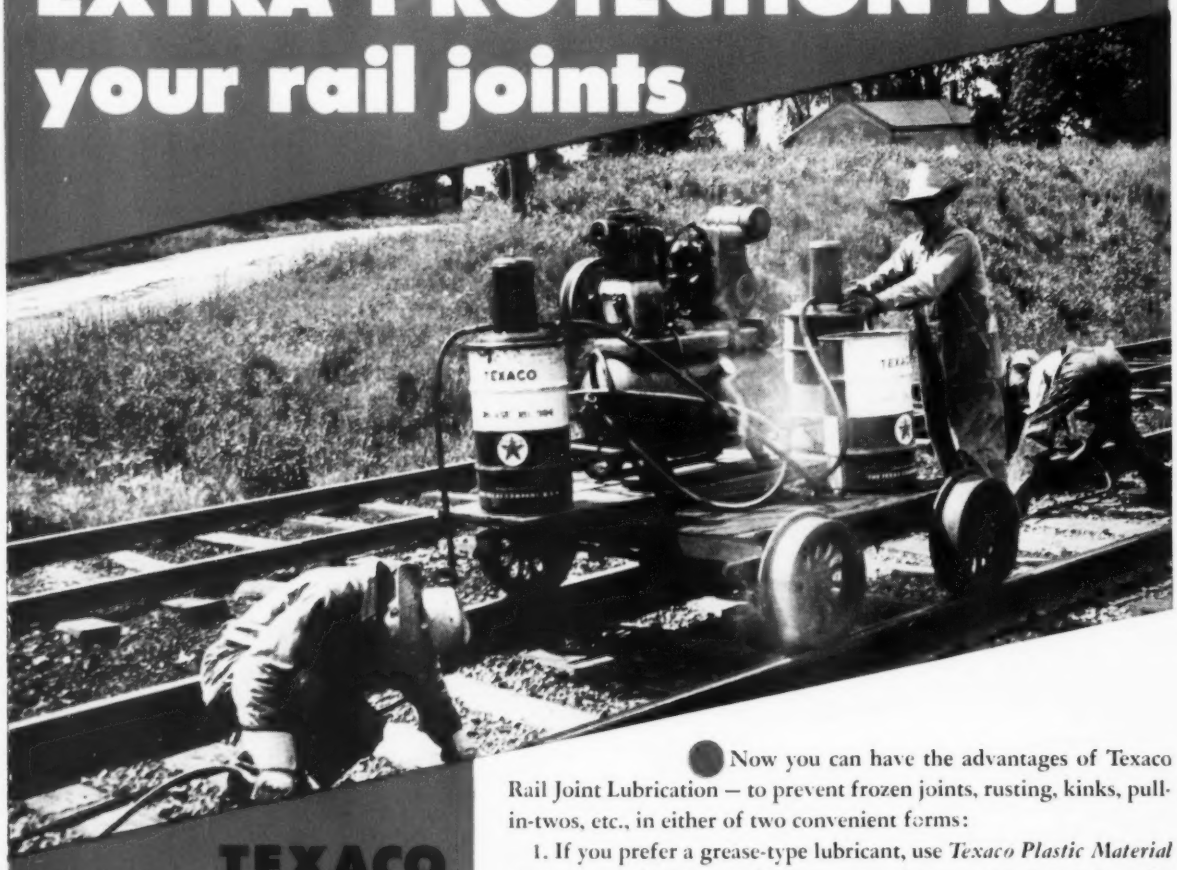

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